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CONDUCTED BY

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(Assisted by several Scientific Gentlemen.)

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No. CCLIX.

RECENT PATENTS.

To Stephen Soulby, *of Ulverston, in the county of Lancaster, printer, for improvements in machinery for letterpress printing.*—[Sealed 1st October, 1852.]

The principle of construction of the machine which forms the subject of the present invention, differs from the ordinary hand-press, and also from the cylindrical or rotary machines now in use, in that the table and type-form are fixed and immoveable on the stationary frame which supports the whole of the machinery; and that the impression-roller, with the inking apparatus attached, is mounted in a travelling-frame, which runs on V-guides, and is furnished with a hand-rail, whereby it can be drawn to and fro over the form, and thereby produce the impression on the paper, which is drawn in by the impression-cylinder.

In order to distribute the ink properly over the surface of the type, a zig-zag or endway motion is communicated to the inking rollers as they run to and fro over the type. The impression-cylinder is mounted in bearings at the end of a pair of levers, one of which is placed on each side of the travelling-frame; and these parts are so arranged, that when the frame is driven back to the feeding apparatus, in order to enable the impression-cylinder to take another sheet of paper from the pile on the table, the cylinder is lifted up, and passes over the form without touching the type; but immediately it lays hold of a sheet, and is drawn back again, it descends, and, on coming into contact with the form, rolls over the type, and by that means transfers an impression

from the type to the sheet of paper that was carried in. The advantage of this arrangement is, that the weight of the moving parts of this machine is considerably less than in those machines in which the table and form are driven under a cylinder; that consequently there is a great economy of working power, and that a machine constructed according to these improvements, can be easily worked by hand labour. The distance the moveable frame, with the impression-cylinder, has to travel, can be regulated to the length or size of the form required to be printed; and therefore the smaller the size of the form, the greater the number of impressions that can be worked within a given time. By the inking apparatus being attached to the frame which carries the impression-roller, it will only be necessary to drive the moveable frame the exact length of the form. The pressure of the impression-roller on the form is obtained, to a certain extent, by its own weight; and by the employment of levers connected to the moving frame of the machine, the pressure may be increased if required.

In Plate I., fig. 1, represents the machine in side elevation; fig. 2, is a plan, or bird's-eye view, as seen from above; and fig. 3, is a transverse vertical section of the same. *a, a, a,* is the fixed framework of the machine; *b, b,* is the moveable or travelling framework which supports the principal working parts, and is made to run in or on horizontal guides *c, c, c,* attached to the fixed framework. The impression-cylinder *d,* is mounted in bearings made in the lever-frame *e, e, e,* which turns on a centre e^*, fig. 1. This centre or fulcrum being attached to the upright standards of the travelling-frame *b, b,* the lever-frame *e, e,* and impression-cylinder *d,* are caused to travel with it. The whole system of inking apparatus, consisting of the ink-trough i^{*1}, distributing and inking-rollers *i, i, i,* and other parts, is also attached to the upright standards of the travelling-frame *b, b*: the upper roller i^{*2}, is caused to revolve (as the frames *b,* and *e,* are moved to and fro) by means of the cord or band 1, passing round the pulleys 2, on the axle of the roller i^{*2}. The ink-trough has a long narrow slot made along the bottom, so as to supply the ink to the first ink-roller: the inking apparatus is also furnished with a pair of additional rollers i^*, i^*, which are made to roll over the form of type, before and after the inking-roller, for the purpose of more evenly distributing the ink, and also taking up and removing any dust, dirt, or other extraneous matters that may get on to the surface of the type. The bed *f, f,* of the machine (and on which the form

of type *f**, *f**, is placed) is stationary, but is adjustable from beneath by the set screws *g*, *g*, two of which are placed on each side of the machine. The paper to be printed is fed into the machine from a table *j*, *j*, which is supported at one end of the stationary framing. When the machine is to be worked by steam-power, the travelling-frame *b*, *b*, with the inking apparatus *i*, *i*, and the impression-cylinder or roller *d*, together with its appendages, is moved backwards and forwards over the stationary form of type, by means of the adjustable cranks, rods, and levers *k*, *k*, and *l*, *l*, which are actuated by the gearing below. The crank-arms and levers are slotted, in order to allow of the extent of motion of the frames *b*, and *e*, being varied, to suit the size of the form of type. One end of the arms of the lever-frame *e*, *e*, is connected by means of a vertical arm *m*, to the slotted rods *l*, by means of the stud *n*. There is a square steadying-piece, (shewn by dots in fig. 1,) which, by running in the guides *c*, maintains the arms in a horizontal position, and yet admits of the arms being pushed back out of the vertical line, as shewn by dots in fig. 1. At one end of the rods *l*, is a slot *o*, which works on a pin *p*, fixed on the side of the upright standards of the travelling-frame *b*,—the other end of the rod *l*, being pierced with holes, so as to allow of the frames being worked at all times as near the paper-board *j*, as possible. The length of the slot *o*, is capable of being adjusted by means of the set screw *q*, for the purpose of regulating the length of the action of the rods *l*, in bringing the arms *m*, into the dotted position, when raising the printing-roller. To the lower part of the travelling-frame *b*, is bolted an arm *r*, which supports a vibrating lever *s*, the upper end of which is forked, and embraces a rod which is connected with the spindles of the two distributing-rollers *i*, *i*, which distribute the ink over the surface of the composition-rollers, whereby the form of type is supplied with ink. The lower end of the lever *s*, is also forked, and embraces a horizontal rod or bar *t*, which is fixed to arms projecting from the side standards of the machine, and is placed obliquely, as shewn in the plan-view; so that as the travelling-frame *b*, moves to and fro, and carries with it the vibrating-lever *s*, *s*, the latter may be vibrated on its centre, and thus made to communicate a zig-zag motion to the distributing-rollers *i*, *i*. It will now be seen that when the rods *l*, *l*, are drawn back in the direction of the arrow, the end of the lever-frame *e*, will be pulled down by the link *m*, into the position shewn by dots in fig. 1, and will consequently raise up the opposite end of the lever-

frame, and lift the impression-roller *d*, above the level of the form of type *f**. The travelling-frame *b*, may then be pushed forward over the form of type to the paper-table *j*, to allow of the impression-roller or cylinder *d*, taking in another sheet of paper. The edge of the sheet of paper is pushed forward by the attendant to a certain mark on the table, so as to allow the tapes and rollers on the rod *u*, to take hold of the sheet. To facilitate this operation, the rod *u*, is mounted in rocking-arms *v*, *v*, and has an up-and-down or lifting motion communicated to it by means of the connecting-rod *w*, which is attached at one end to the arms *v*, and at the other end to the vertical arm *m*. It will now be understood, that when the rods *l*, *l*, are drawn back in the direction of the arrow, the impression-cylinder *d*, will be lifted up, and the rollers and tapes on the rod *u*, will be raised from the surface of the impression-cylinder or roller; then, by pushing forward the travelling-frame *b*, up to the paper-table *j*, the edge of the sheet of paper will be inserted between the small rollers of the rod *u*, and the impression-cylinder; and when the arms *l*, *l*, are drawn back again, their first action will be to pull back the vertical arm *m*, and thereby cause the rollers of the rod *u*, and also the impression-cylinder, to descend, and assume their original position. By this means the small rollers of the rod *u*, press the paper on to the impression-cylinder; and, as the latter is made to rotate by friction of contact with the fixed wooden rails placed upon the plate *f*, (but not shewn), the paper is carried round the impression-cylinder, and is, by the onward motion of the travelling-frame *b*, *b*, brought into contact with the form of type, which has been previously supplied with ink by the rollers of the inking apparatus; which, both at their forward and backward motion, are made to roll over the type. From this arrangement and construction of the working parts, it will be seen that the pressure of the impression-cylinder on the type is not due simply to its own weight, but, being mounted at one end of a vibrating lever, the pressure of the cylinder is increased by the power necessary to be exerted in moving the travelling-frame and all its appendages. To prevent the printing-cylinder *d*, from bumping up and down when passing over the forms of type, by reason of its entering the spaces between the pages of the form, and thereby spoiling the impression, guide-rails are placed alongside of the form, for the ends of the printing-cylinder to run upon; or, if preferred, rollers or wheels, as at *z*, fig. 1, may be mounted at one end of the lever-frame *e*, and made to run on V-guides, so as to support the frame *e*,

when the impression-cylinder is not in contact with the form of type.

It will be seen, upon referring to figs. 1, and 2, that instead of the arms of the lever-frame *e*, being jointed direct to the upper end of the vertical arm *m*, this connection is effected by means of adjusting-screws, which will admit of the arms *e*, being screwed up or down, so as to regulate, with nicety, the pressure of the cylinder at the opposite end of the frame *e*; by which means a greater or less pressure on the face of the type may be given at either end of the cylinder.

The bed, on which the form of type is placed, also admits of nice adjustment, by means of the screws *g*, *g*. For instance, if, upon examination of a proof, it should be found that any particular part of the form (say, for example, one corner thereof) is too pale, in consequence of a deficiency of pressure, this defect can be easily rectified by slightly raising that part of the bed by means of one of the screws beneath that particular part.

The arrangement of the strings or tapes for conducting the paper into, through, and out of the machine, is similar to that usually employed in printing-machines, and therefore needs no particular and detailed explanation.

From the above description it will be seen, that in the operation of printing it will only be necessary to traverse the travelling-frame and its appendages, a few inches beyond the length of the form of type, as the inking apparatus is carried with the impression-cylinder; and the distance the travelling-frame will have to move will depend upon the length of the form: the same machine may therefore, without great inconvenience, be employed to print large or small forms; or, in fact, any form less than the dimensions of the bed,—the speed of the printing operation of course increasing with the decrease in the size of the form; as the distance to be travelled over will, of course, be diminished. In order to prevent the workman (when the machine is driven by hand-labour) from moving the travelling-frame too far either way, wooden stops *y*, are placed at one end of the side-grooves *c*, *c*, of the machine. These stops are made capable of adjustment in the grooves *c*, *c*, and may be fixed at any point; so that, when working a small form, they will prevent the workman from pulling back the travelling-frame further than is necessary.

The patentee claims, First,—the general arrangement of the machine as herein shewn and described. Secondly,—mounting the impression-roller or cylinder in a lever-frame,

which, being moveable, admits of the roller or cylinder being moved backwards and forwards over the form of type, which remains stationary on its bed. He claims, particularly, the arrangement shewn, or any mere modification thereof, whereby the impression-cylinder, when moved forward with the paper to be printed, is made to press on the surface of the type; and, when moved back with the printed sheet, is lifted and carried over the type without touching the same. Thirdly,—the combination of the inking apparatus with the impression-roller in one travelling-frame, so arranged and operated that it may be made to traverse any required distance, according to the size or dimensions of the form of type to be printed; and also adjusting the bed on which the form of type is placed, as shewn and described.

To THOMAS DICKASON ROTCH, *of Furnival's Inn, Gent., for improvements in treating peat, and in manufacturing fuel and other products therefrom.*—[Sealed 1st October, 1852.]

THIS invention consists in procuring fresh peat and separating or tearing it apart whilst immersed in a tank of water, in such a manner as to separate the roots and fibrous portions of the peat from the other parts, which form a sediment, to which the patentee has given the name of "peat paste," and which he collects, moulds, dries, and, in some cases, carbonizes, and thus obtains a highly condensed, hard, and inflammable substance.

In Plate III., fig. 1, represents one form of apparatus (there being many others which would accomplish the same object), which he considers particularly simple and efficient for preparing the peat to form the paste. A, is a wooden case or vat, rounded at the four corners, in which are placed four vertical shafts *b*, *b*, driven by the horizontal shaft and spur gear B^1, and carrying fans or arms *c*, *c*, working between other arms *p*, *p*, fixed to the side of the case or vat, after the manner of an ordinary pug-mill. This vat being half filled with water, and fresh peat being introdued by means of the hopper B, the vertical shafts *b*, *b*, are put in motion, and cause the process of separation to be effected. The wooden vat has a false bottom R, of wire gauze, from one end of which the pipe E, furnished with a sluice S, leads into the wire-gauze cylinder D, which is placed at an inclination immediately below the vat. A*, is a cock for carrying away the water from the vat from time to time. When the peat has been well

broken up, the sluice s, may be opened, to allow the charge to flow into the cylinder D, through which the shaft D*, runs. This shaft carries brushes *d, d,* placed at an angle thereto, and intended to brush out through the spout *p**, the fibrous and other matter which was unable to pass through the wire-gauze cylinder. The machine is set in motion by means of a strap passing over the pulleys *a,* and C, and may be driven by any adequate power. As the shaft D^1, revolves, the pasty residuum falls into the tank Q, below; and it is there collected and removed to the moulding-machine. If, however, when removed, the paste should be in too liquid a state to be conveniently moulded, it must be pressed between two cloths, passed between squeezing rollers; or it may be put in a press, as shewn at fig. 5, which is a simple perforated wooden tank, lined with wire gauze, in which the wet paste is acted upon by a piston from above. In reference to the other matters used in the water-bath, previously alluded to, the patentee states that, if the peat is of a dry character, he adds a small quantity of marl, clay, or fullers' earth, to the water in the bath, according to the quality of the peat,—rich or fatty requiring less than the dry sort. He also mixes with the water in the vat various other substances, such as gums, glutens, and the like.

The patentee next proceeds to describe the moulding apparatus, shewn in section at fig. 2, and in plan view at fig. 3; in which A, is the framework of the machine, carrying a strong cross-bar B, B, which supports the round metal disc or table C, having a shallow rim or border all round it. An octangular metal frame D, supported on friction-rollers *c,* revolves upon this disc, and is keyed on to the vertical shaft E, by means of the arms F, and driven by the pulleys *g, g.* In each octagon of the frame D, a half mould I, is placed, having a piston J, to act in it, containing the other half of the mould; and the two parts are brought together, when required, by the rollers *o, o,* acting against the fixed excentric cam O, with which they come in contact by the revolving of the frame; so that when the paste to be moulded is introduced by the hopper U, into the mould, the piston J, acted upon by the cam O, gives it the necessary pressure as it passes round; and as the frame continues its revolution, and the piston is released from the cam, the spring *a,* withdraws the piston, and the piece of paste P, which has thus been moulded, falls through an opening M, into a trough N.

The patentee states that there are other known modes which may be applied for moulding this paste. After it has

been moulded, it may further be subjected to the process which he calls "carbonization," when it is required to be used in a particularly pure state. For this purpose he employs the furnace shewn at fig. 4, which represents an iron vessel Y, with a cupola top, introduced into a furnace *a*, *a*. Into this iron vessel the pieces of moulded paste are introduced,—a layer of sand having first been spread over the bottom of the vessel, to prevent their coming in immediate contact with it. When the fire is lighted, the operation should be continued for about two hours; and the absence of smoke will indicate that the operation is completed. The top of the cupola is furnished with a valve *z*, which can be opened or shut at pleasure;—there are also two pipes *b*, *b*, from which elastic tubes may be brought to convey into the interior of the furnace the escaping gases, which are to enter from below, and thereby assist the combustion.

The patentee claims, First,—the beating to pieces or separating of the various particles of matter contained in what is ordinarily called peat, in a menstruum of water or other suitable fluid, whereby he is enabled to remove the rooty and coarse fibrous matter therefrom. And, Secondly,—he claims the sediment obtained thereby, which may be collected, dried into a paste, pressed into moulds, and finally made into a highly condensed, hard, and inflammable substance, adapted for fuel and other purposes.

To JOHN LAWRENCE GARDNER, *of Whitecross-street, London, ink maker, for improvements in bottles and other vessels for holding liquids.*—[Sealed 1st October, 1852.]

THIS invention relates to improvements in bottles and other vessels, and is intended to prevent any inconvenience from the regurgitation of the air, by means of a second channel or passage, which is to admit atmospheric air while the liquid is being poured out from such bottles. There is an uneven jerking flow, which disturbs the sediment or crust which may have become deposited, when pouring out from bottles of the ordinary construction, owing to the bubbles of air forcing their way through the liquid; and, in some cases, it is necessary to pour off or decant the liquid, and allow it to settle again, in order that the disturbed sediment may again be deposited; and, in pouring out acids, accidents sometimes occur through the effects of regurgitation.

In Plate I., fig. 1, shews a section of a bottle, with a second

or extra aperture. When moulding this bottle, a triangular depression *a*, is made in the neck of the bottle, so as to divide it into two distinct channels, *b*, *c*; but above the part *a*, the neck is of the usual circular form: for the purpose of decanting its contents, it is held so that the channels *b*, and *c*, are in a horizontal position. Air then passes into the bottle through the upper channel, while the contents flow out equably, and without the slightest agitation, through the lower one. In fig. 2, the air-passage *d*, is a small tube, moulded on the inside of the neck of the bottle,—not rising sufficiently high to interfere with the cork. Upon pouring out its contents, the air will pass down the tube *d*, and thereby ensure an even flow of the fluid. The air-passage in fig. 3, is a tube formed upon the outside of the bottle, and provided with a supplementary cork or stopper. At fig. 4, the object is effected by the addition of a small neck *f*, formed on the shoulder of the bottle. The patentee remarks, that in vessels adapted for holding varnishes, oils, molasses, treacle, and other thick matter, his improvements will be found useful, by greatly facilitating the pouring off of the contents. Figs. 5, 6, and 7, shew the improvements adapted to these bottles. In fig. 5, the air-channels are pierced through a portion of the material forming the neck; and in figs. 6, and 7, the air-passages are shewn,—the one placed in front, and the other at the back, of the handles of the bottles. At figs. 8, 9, and 10, the improvements are shewn as applied to carboys, and other similar vessels. *l*, fig. 8, is the air-passage; fig. 9, is a vessel having two necks, one for the purpose of pouring out the contents, and the other for the admission of air. At fig. 10, the channel is on the outside of the neck of the vessel, similar to the bottle shewn at fig. 3. In using vessels for acids, such as herein described, the flow of the acid may be regulated by partially stopping the air-passage or supplementary neck. The patentee remarks, that glass bottles, or other vessels, constructed according to his invention, may be made by moulding, pressing, and blowing, as is well known in the glass trade; his improvements being only additions, in some instances, or making channels or passages in other cases.

The patentee makes no claim to the form of the bottles or other vessels, neither does he restrict himself to the use of these or any other form of bottle or vessel for holding liquids; but he claims the manufacture and use of bottles and other vessels for holding liquids, having therein or thereon a second or extra aperture, channel, or passage, for the admission of atmospheric air, whilst pouring off the contents thereof.

To WILLIAM MOORE, *of Birmingham, and* WILLIAM HARRIS, *of the same place, gun makers, for an improvement in repeating pistols and rifles.*—[Sealed 1st October, 1852.]

THIS invention consists in constructing the frame, in which the chambers of repeating pistols and rifles work, with a joint, so that the barrel along which the projectile is urged, after leaving the revolving-chamber, may be readily removed from the front of the said revolving-chamber, so as to facilitate the loading of the said chamber; and by this method of construction, the advantage is obtained of being able to connect the barrel with the revolving-chamber during the discharge of the pistol or rifle, as hereinafter explained.

In Plate II., fig. 1, represents, in vertical section, a pistol, made according to this invention, and fig. 2, is a side elevation of the same; *a*, is the barrel, which is connected with the body of the pistol by the joint *b*, in the frame *c*. In fig. 1, the frame is represented as closed; and in fig. 2, as open, by the disengagement of the fastening at *d*, and the raising of the barrel *a*, upon the joint *b*. The joint may be made in any convenient manner; but the patentees state that an ordinary hinge-joint, from the middle of which a portion has been cut away to admit of the action of the hammer, answers very well. On bringing the barrel *a*, into its place, the ends c', c'', of the frame become connected together by the fastening represented, and which is made as follows: e', is a spring, which bears against the side of the frame *c*, and carries a stud *f*, having an inclined face, as shewn by dotted lines in the edge view, fig. 3. When the vertical side of the frame is brought down into its place, the end thereof presses back the pin *f*, out of the frame, until the hole *g*, is opposed to the said pin *f*; the pin is then forced into the hole by the spring *e*, and the fastening is effected. By pressing on the button *h*, the pin *f*, is disengaged from the hole *g*, and the barrel *a*, and vertical side of the frame may then be raised. *i*, is a conical annular projection on the end of the barrel *a*, which is made accurately to fit the funnel-shaped mouths of the detonating barrels *k*, *k*, of the chamber *l*, and against which projection the said mouths of the detonating barrels are forced, at the moment of discharge, in the following manner. *m*, is a hollow fixed axle, on which the chamber *l*, rotates; this chamber *l*, is keyed, by a sliding-key, to the axle *n*, which passes through the fixed hollow axle *m*, into the interior of the lock, and carries on its end the disc *o*, on the face of which a series of ratchet-teeth are made. By pressing the trigger *p*, the arm

or lever *q*, which is pressed against the face of the ratchet by the spring *r*, engages with one of the teeth of the ratchet, and moves the chamber through one-sixth part of a revolution, by which a detonating barrel *k*, is brought opposite the barrel *a*. The continued motion of the trigger brings the shoulder *s*, of the link *t*, against the end of the slide *u*, and forces the slide against the posterior face of the chamber *l*, so as to cause it to slide on the hollow axle *m*, and axle *n*, and bring the funnel-shaped mouth of the barrel *k*, to bear against the conical mouth *i*, of the barrel *a*; and thus, during the explosion, to constitute the two barrels one continuous barrel. When the trigger has been moved to its full extent by the pressure of the finger, the shoulder *s*, of the link *t*, escapes from the shoulder *v*, of the trigger, and the hammer falls; but the slide *u*, is kept in its place by the pressure of the shoulder *v*, of the trigger, which comes in contact with it at the moment when the shoulder *s*, of the link *t*, escapes from it.

On the hammer being again raised, the slide *u*, is forced back by the spring *w*, and the chamber *l*, is forced back so as to disconnect itself from the barrel *a*, by the coiled spring *x*, forcing the plug *y*, against the anterior face of the chamber *l*. The posterior face of the chamber *l*, is formed into a series of inclined planes; so that when the slide *u*, is pressed forwards, the face bearing against the end of the slide causes the chamber to advance as it rotates, and gradually to bring the funnel-shaped mouth of the detonating barrel close against, and, at the proper moment, to force it into contact with, the projecting end of the barrel *a*.

By pulling the trigger to any extent, short of what is necessary to discharge the pistol, and afterwards removing the finger from the trigger, the cock or hammer is raised from the nipple *z*, and locked in that position until it is liberated by the further action of the finger on the trigger. The locking of the hammer 1, is thus effected:—By partially raising the hammer 1, the slide *u*, urged by the spring *w*, escapes from the shoulder 2, against which it previously pressed; and being shot by the spring *w*, under the shoulder, the hammer can no longer fall to its full extent,—the under part of the shoulder 2, bearing upon the top of the slide *u*. When, however, the trigger *p*, is pulled so far that the hammer becomes detached from it, in the manner already described, the slide is at that time pressed against the chamber *l*, by the shoulder *v*, of the trigger; so that, when the hammer falls, the slide *w*, on the finger being removed from the trigger, bears against the vertical face of the shoulder 2, of the ham-

mer; and it is only after the hammer has been partially raised that the slide *u*, assumes the position represented, by escaping underneath the shoulder 2.

The principal precaution necessary in opening the frame, for safely loading, is that of first placing the pistol at half-cock, which is done by a partial pull of the trigger, or by placing the thumb upon the cock in the usual manner of cocking. The barrel may, as heretofore, be either screwed into or in the front portion of the frame; or the front side of the frame may be made of the same piece of iron or steel as the barrel.

The patentees claim the construction of a hinge-joint frame for containing the chamber of repeating pistols and rifles, whether the said hinge-joint be situated in that part of the said frame herein described, or in any other part of the said frame; whereby the several advantages herein described, as arising from the said hinge-joint frame, may be realized.

To THOMAS HUCKVALE, *of Choice-hill, near Chipping Norton, farmer, for improvements in instruments for administering medicine to horses and other animals.*—[Sealed 1st October, 1852.]

THIS invention consists in having a cylinder or vessel to contain medicine, fixed at the end of a stem or tube, there being a piston in the vessel, the piston-rod of which passes through the tubular stem, so that the piston may be forced outwards after the cylinder or vessel has been introduced into the mouth of the animal.

In Plate I., fig. 1, represents a section of an instrument, having only one cylinder or vessel applied thereto; fig. 2, shews another instrument, having two cups or vessels; and fig. 3, an arrangement where the vessels or cylinders can be drawn backwards on the stem or piston-rod.

The patentee states, that it is necessary, in using the instruments, that one hand only should be used,—leaving the other free to hold the animal's head. *a*, (fig. 1,) is the stem or handle, which has, within it, the piston-rod, which carries a button *b*. This button slides in a slot in the stem or handle, by which means the piston and piston-rod can be slidden by the thumb of the hand in which the handle *a*, is held; the other hand of the person administering the medicine being thereby left free to be employed for holding the head of the horse or other animal operated upon. *c*, is the piston fixed

to the piston-rod; and *d*, is the vessel (in which the medicine is placed) fixed to the handle *a*. In fig. 2, the instrument is shewn as having two pistons affixed to the piston-rod, and two vessels fitted to the handle *a*. In fig. 3, the parts of the instrument are arranged in such a manner that the two vessels are connected together, and the ends of the stem act as the pistons. The instrument is held by grasping one of the vessels, and it can be worked by placing the thumb of the hand which holds the instrument against a stop *b*, fixed on the stem.

The patentee claims the combination of parts herein described.

To Michael Cavanagh, *of Notting Hill, locksmith, for certain improvements in mortice-lock spindles.*—[Sealed 2nd October, 1852.]

This invention consists in certain improved modes of making lock-spindles, which will admit of being adjusted to doors of various thicknesses.

In Plate III., fig. 1, represents, in front view, an improved lock-spindle; fig. 2, is a longitudinal section thereof; and fig. 3, a sectional end view of the adjusting-spindle or regulating-core, separately shewn. *a*, *a**, are the knobs or handles; *b*, the thickness of the door through which the spindle passes, taking into the latch or bolt of the lock in the usual manner; *c*, *c*, are hollow metal shanks, firmly fixed to the handle, for the purpose of retaining and regulating the spindle to the required thickness of the door; *d*, is the adjusting-spindle or regulating-core, composed of three pieces, *e*, *f*, *g*,—the outer pieces *e*, and *g*, being provided with studs or pins, *h*, and *i*, of the same form and size as the rack openings or recesses *j*, *j*, formed in the hollow shank or tube *c*, into which they take. The construction of the spindle consists in its being made of three distinct pieces; so that on removing the centre piece or wedge *f*, the two outer pieces *e*, and *g*, fall together, and remove the studs *h*, and *i*, from the rack-holes in the hollow shank *c*; by which arrangement the spindle can be adjusted to any required length, by the simple operation of re-inserting the studs or pins in different rack-holes or openings, according to the thickness of the door to which the spindle is applied, and again introducing the centre-piece or wedge.

Figs. 4, 5, and 6, represent, as a modification of the first-mentioned arrangement, the hollow metal shank or tube,

inserted within the knob or handle, for the purpose of giving increased strength and thickness to the adjusting-spindle, and obviating the necessity of extending the mortice in the lock or door. *a*, *a**, are both hollow handles or knobs; *b*, the thickness of the door; *c*, *c*, the adjusting tubular rack; *e*, *e*, set-screws, for fixing the knobs or handles to the shank or spindle; *f*, *f*, are the rack openings; *g*, *g*, the two adjusting-studs; and *h*, *i*, and *j*, the three separate pieces of which the spindle is composed.

The patentee claims, the mechanical arrangement and construction of lock-spindles, having an adjusting-core of three pieces or parts, as aforesaid, in connection with the tubular stem, rack, and studs, as hereinbefore described.

To William Edward Newton, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in machinery for boring or cutting rocks or other hard substances, for the purpose of tunnelling through mountains, or making other excavations.*—[Sealed 5th October, 1852.]

This invention consists in employing one or more rotating metal discs, or one or more sets of discs, with their peripheries or cutting edges properly adapted to cut away the surface of the stone by rolling against it; in doing which they shall describe in their action a segment of a circle from the centre to the circumference of the tunnel or other perforation to be made, in combination with a slow motion, around the said centre of the tunnel or other aperture, whether the two said motions be continuous, intermittent, or reciprocating; whilst, at the same time, the entire machine, or that portion of it which carries the cutting discs, is capable of being moved forward, or advanced in the direction of the axis of the tunnel or other aperture that is being cut, in order to keep the cutters to their work as the face of the stone is cut away by the operations of the machine.

In Plate II., fig. 1, is a plan view of the machine complete; fig. 2, is a front elevation; fig. 3, is a longitudinal vertical section; and fig. 4, is a detached sectional view of one of the cutting discs, drawn in the line of its axis: *a*, *a*, is the frame of the machine, the platform of which is mounted on slides *b*, *b*, fitted to and sliding on rails *c*, *c*, laid along the bottom of the tunnel, as the boring progresses. These rails may be laid in any appropriate manner, or, instead of the rails, the platform may be provided with wheels, to run di-

rectly on the bottom of the tunnel, or otherwise adapted to move thereon. On the frame is mounted a hollow shaft *d*, which is adapted to turn in appropriate boxes *e, e*, in the standards *a, a*, of the frame, so that it can turn freely and accurately. To the forward end of this hollow shaft is properly secured a cog-wheel *f*, the cogs of which are engaged by a pinion *g*, on a shaft *h*, provided at the other end with a cog-wheel *i*, which engages a worm *j*, on the transverse shaft *k*. Motion is communicated to this shaft *k*, from the driving power, in any convenient manner, for the purpose of giving a slow rotary motion to the wheel *f*, and hollow shaft *d*. The front face of the wheel *f*, is provided with flanches or arms *l*, in which are hung two rocking-shafts *m, m*, which carry two sectors *n, n*; and as both are similar in construction and operation, the description of one of them will be sufficient. The sector *n*, is provided, at or near the ends, with two rotating discs *o, o*, mounted on appropriate arbors or spindles *p, p*, the axes of which are at an angle of 45° (more or less) with the axis of the rocking-shaft *m*. The arbor of each disc is fitted to turn freely, but accurately, in a tube *q*, the bore of which is eccentric to its outer periphery. This tube is in turn fitted to a box *r*, on the sector *n*, so that it can be turned and moved endwise therein, for the purpose of setting the disc as may be desired, and there secured in its place by a set-screw or other appropriate means.

The object of this mode of adjustment is to set the cutting edges of the two discs, so that one shall, in the vibrations of the sector, describe a different track from the other, in order that one may cut what the other does not; and it will be obvious, from the foregoing, that this adjustment can be readily effected by turning and sliding the excentric tubes in which the arbors of the discs turn. The inner ends of the two sectors are jointed to two connecting-rods *s, s*, (see fig. 3,) which extend into the hollow shaft *d*, and which are jointed at the other end to a cross-head *t*, on a sliding-rod *u*, which is appropriately guided in the hollow shaft as it receives a reciprocating motion by a connecting-rod *v*, from the arm *w*, of a rocking-shaft *x*. This shaft *x*, receives motion from the piston-rod *y*, of a steam-engine.

The arm of the rock-shaft *x*, which receives motion from the piston-rod of the engine, is in turn connected by a rod *z*, with a crank a^1, on the shaft of a fly-wheel b^1, to ease off the shocks which would otherwise be produced by the strokes of the engine. The feeding motion, for turning the wheel *f*, which carries the cutting apparatus, can be derived in any

appropriate manner from the shaft of the fly-wheel, or from the rocking-shaft *x*.

From the foregoing it will be seen that, as the entire machine is advanced, the rotating cutters are brought in contact with the face of the rock or other hard substance to be cut; whilst the vibratory or reciprocating motion given to the sectors, in opposite directions, causes the cutting-edges of the discs to describe each a track from the centre of the wheel *f*, to the periphery and back again; each one describing an arc of a circle in the plane of the radii: and, as the wheel *f*, is rotated with a slow motion, a series of cuts will be made by the peripheries of the cutters, which will be nearly in the direction of the radii, gradually shifting around the entire circle; and so on in succession,—the entire machine being moved forward, by any desired means, to keep the cutters against the face of the stone.

The patentee remarks, that he has described the machine with two sectors and two rotating discs on each sector; but it will be obvious that it can be made with only one, or with more than two; and each sector with one or more discs. He does not wish to confine himself to the use of vibrating sectors for operating the discs, as it will be obvious that the discs can be connected with the periphery of a wheel or wheels having a continuous rotary motion imparted by cog-wheels, or their equivalents, by means of a shaft passing through the hollow shaft *d*, or by any other suitable mechanical means. And, as to the mode of rotating the cutting apparatus about the centre of the tunnel or other aperture, to make the series of cuts, it will be obvious that this can be done by a continuous or intermittent motion in one and the same direction, or by a reciprocating motion. And, finally, as to the progressive motion of the entire cutting apparatus in the direction of the axis of the tunnel or excavation, to keep the cutters against the face to be cut,—it can be continuous or intermittent; and may be communicated in various ways, such, for instance, as is shewn in fig. 1, where screws d^1, d^1, are made to work in standards e^1, e^1, secured to the bottom of the tunnel, and acting against the end of the frame; or, by means of levers acting against the frame and abutting against some solid part of the tunnel, the whole machine may be pushed bodily forward.

The patentee claims the method herein shewn and described, or any mere modification thereof, for applying rotating discs or cutting-edges for boring or excavating tunnels and other apertures in rock or other hard substances, by

causing the said cutters or rotating discs, or sets of rotating discs, to describe circles from the centre, or near the centre, to the periphery of the tunnel or other excavation, in combination with a motion or motions around the centre of the said tunnel, to cause the said cutter or cutters to act in succession on the entire surface to be cut away.

To Joseph Henry Tuck, *of Pall Mall, engineer, for improvements in stuffing-boxes, and in packing to be used in stuffing-boxes, bearings, pistons, and valves.*—[Sealed 14th October, 1852.]

The object of this invention is to make an enduring packing for piston-rods, pistons, valves, stuffing-boxes, bearings, and other rubbing surfaces. Instead of using hemp or metal packing, as heretofore, the patentee constructs a packing, composed partly of yielding and partly of rigid substances. The elastic part of the packing is, by preference, composed of rolls or folds of canvas, coated with India-rubber; and in the tubes or ribs of this stuffing, strands or blocks of India-rubber may be inserted. The hard substances, used in conjunction therewith are segmental or other suitably-shaped pieces of wood or metal, which are intended to lie or work in contact with the metallic surface, whether moving or stationary (as the case may be) against which the packing is intended to bear; the segmental or other shaped pieces being kept up to the rubbing surface by the elastic pressure of the yielding substance. In order to ensure the proper action of this substance in glands or stuffing-boxes, the interior of the gland is made conical, or in the stuffing-box a conical filling piece is inserted, which will answer the same purpose. By this means the pressure downwards of the gland or cover of the box, will ensure the proper binding of the packing around the piston-rod. In some cases a half-round annular groove is turned in the gland or stuffing-box, to act as a second oil cup, and thereby prevent the waste of the oil. The segmental pieces may be put together, so as to present a continuous hard surface to the piston-rod, in the form of a tube (the pieces being put together as rings, forming break-joints, and locking the one ring into the other, to prevent the independent movement of any one piece); or, between the rings, the elastic material may be interposed, so as to present a varied packing surface of alternate rings of flexible or elastic, combined with rigid or unyielding, materials.

In Plate II., fig. 1, represents a vertical section of a stuffing-box, with its packing, constructed and arranged upon the improved plan. *a*, is the stuffing-box; *b*, the gland; *c*, the bottom bush of the ordinary stuffing-box; *d*, is a lining, constructed in the form of the frustrum of a cone, and formed, by preference, of wood or other rigid material, which is a bad conductor of heat. This lining is composed of any given number of parts, which, when assembled together, form the frustrum of a cone, as shewn in the figure. *e*, is the improved elastic packing,—or other ordinary packing may be used, if preferred; *f*, is the piston-rod or rubbing surface, against which the packing is forced by screwing down the gland *b*. It will be readily seen that a slight pressure on the gland *b*, will force the soft or elastic packing down, and compress it inside the cone *d*, which, being of an inclined or wedge form, thereby forces the packing *e*, directly against the rod *f*, and keeps it steam-tight. Fig. 2, is a vertical section, shewing a modification of the above: the parts *a*, *b*, *c*, *d*, *e*, and *f*, are the same as in fig. 1. *g*, *g*, are rings of metal, or other suitable material, cut into two or more parts, and placed between the rings or layers of soft packing; thus presenting a compound surface to the rod *f*, or other sliding part. Fig. 3, represents a modification of fig. 2: in this instance, however, the cone or lining *d*, is dispensed with. In fig. 3, the hard rings consist of four parts or two rings of triangular section, placed together base to base; thereby forming one ring. In fig. 4, a series of rings, each consisting of two or more parts, are shewn as placed one upon the other, so that a solid surface is presented to the rod or portion liable to friction. Behind these rings, which form a cylinder or cone, as the case may be, according to the shape of the backs of the rings, soft packing is applied, which, when pressed down, forces the hard rings *g*, *g*, against the piston-rod or other moveable rubbing surfaces. In fig. 5, a double series of rings, each of two or more parts, which are of a triangular section, are placed upon each other: the rings *h*, *h*, are forced back against the inside of the stuffing, and the rings *g*, *g*, are forced against the rod or moving surface, by being pressed from above. *j*, *j*, are rings of soft packing, to fill up the space at the back of the rings *g*, *g*.

Fig. 6, is a vertical section, and fig. 7, a plan view, of another improvement in stuffing-boxes, the object of which is to admit of the lining or stuffing being removed from the box with greater facility, and in a more convenient manner than is usually the case. The stuffing-box is lined with a metallic

cup or box *k*, *k*, which is so made and adapted to the stuffing-box that it may be drawn out of the box, and bring with it the whole of the packing which is placed in the cup, box, or lining *k*, *k*. This cup or lining is made of two or more parts, and the upper flange thereof rests upon the flange of the stuffing-box *a*. The packing is shewn in the drawing as being made upon the principle already described, and consists of a cone *d*, composed of wood or other bad conductor of heat, combined with soft elastic packing *e*, which is, or may be, compressed against the rod *f*, by screwing down the gland *b*. The cup or lining *k*, and packing contained therein, may be drawn up out of the stuffing-box by means of the screws *l*, *l*,—the shoulders of which bear upon the plate *m*, which lies on the flange of the stuffing-box *a*. A jam-nut *n*, is provided for securing the screws at any point where the cup or lining *k*, has been raised high enough. As the cup or lining *k*, is constructed in two or more sections, it will be evident that, when it has been raised out of the stuffing-box, its parts may be separated and removed; thus leaving the packing exposed and entire upon the rod or trunnion, so that it may be adjusted, repaired, or removed, as may be required. It is stated, that any of the plans above shewn and described, for making a packing or lining for stuffing-boxes, may be adapted to, and employed in connection with, the improvement just described, with relation to figs. 6, and 7; or any ordinary packing may be used,—the object of this improvement merely being to enable the packing to be lifted or drawn out of the stuffing-box with facility when it is required to be repaired, adjusted, examined, or removed.

In figs. 8, 9, 10, 11, and 12, several methods of adapting the improved system of compound packing to D-slide valves is shewn. Fig. 8, represents a plan view of the packing suitable for a D-slide valve, with the improvements adapted thereto. Fig. 9, is a view of the packing as seen from the inside; and fig. 9ª, is a cross section of the same, taken in the line 1, 2, of fig. 9.

The slide or moving surface, is shewn at *o*. The hard packing *p*, is kept against the slide, or moving surface, by the soft or elastic packing *q*, at back, which is pressed forward by the metal jacket *r*. The hard packing consists of an entire metal surface presented to the slide, and formed of a series of flat-linked or mortice-jointed chains, lying close against each other, and rivetted throughout, and kept up to its proper position against the slide by the soft packing and jacket *r*, at the back and ends.

Fig. 10, is an end view of another mode of making packing for D-slide valves. In place of the metal chain *p*, shewn in fig. 8, the hard surface is composed of metallic plates or bands, the edges of which are turned up, so as to form a kind of trough or groove, as shewn in the inside view fig. 10[a]. Behind these metal plates or bands *p*, is placed the soft packing *q*, which is pressed forward, as in the other instance, by the jacket *r*.

Fig. 11, is a sectional view, and fig. 11[a], a cross section, of another modification, in which the metal rubbing surfaces *p*, of the other plans is dispensed with, and a soft or elastic packing is employed in place thereof. *s*, and *t*, are sheets or bands of canvas, which are sewn together, but have between them strips of caoutchouc, or other elastic material *u*, *u*, for the purpose of giving elasticity to the packing, which is pressed against the slide by means of the jacket *r*, at back, as in the former instances.

Fig. 12, is another modification, in which the hard and soft surfaces are combined. The hard or metal surface is composed of segments of rings *p*, the section of which is of a wedge form, as will be seen by referring to the cross section, fig. 12[a]. Between these segments is placed the soft packing *q*, which is pressed up against the hard packing by the jacket *r*, as before.

This improved system of compound packing, composed of rigid and solid materials, is also applicable to packing the rubbing surfaces of rotary engines, as will be seen by reference to fig. 13, which represents a longitudinal section of a rotary engine, with the improvements adapted thereto. *a*, *a*, are the cylinder heads or ends; *b*, *b*, is the piston; and *c*, *c*, the jacket. *d*, *d*, is a serrated piece of metal or wood, let into a groove or recess, made in each end of the piston; and *e*, is another serrated piece, of the same form and material, also inserted in the same groove; but allowed to be forced outward towards the cylinder-head by the double serrated piece *f*, which is acted upon by the inclined planes *g*, *g*, which are moved by a right and left-handed screw-rod *h*. This screw-rod *h*, may be turned by means of a socket-spanner or other instrument inserted in the opening filled by the plug *i*. *k*, *k*, is a soft packing, inserted between the back of the serrated piece *e*, and the metal plate *l*, which is divided into triangular pieces.

It will be easily perceived, that in order to tighten the packing in the ends of the piston, it will not be necessary to remove the cylinder-heads, as is usually the case, but simply to take out the plug *i*, to allow of a socket-spanner being

fitted on the end of the screw-rod *h*; by turning which, the two inclined pieces, or wedges, will be drawn towards each other. The double serrated piece *f, f*, will, by this means, be forced upwards, and, acting against the parts *d*, and *e*, will drive the piece *e*, outwards towards the cylinder-head, and carry with it the soft packing *k*, which will force the triangular pieces *l, l*, against the cylinder-head. The ends *m, m*, of the jacket *c*, are turned to a sharp bevil towards the inner surface of the inner plate *a*. A conical metal ring *n, n*, composed of one or more parts, is fitted thereto, and the space behind is filled with soft packing *o, o*, which may, by the screws *p, p*, be forced up against the rings *n, n*, and thereby press them against the cylinder-head *a, a*. The ends of the screws *p, p*, bear against the rings *r, r*, and thereby force forward the soft packing *o, o*, and other parts contiguous thereto.

The patentee claims, the methods herein shewn and described, or any mere modification thereof, of combining hard and soft substances together, for the purpose of making steam-tight elastic packing. He claims particularly the use of the conical cup *d*, behind the elastic packing, whereby the soft packing is prevented from being over-heated. Also, the method, above shewn and described, of packing the pistons, and other parts of rotary engines, or any modification thereof, whereby the packing may be tightened with facility, without removing the cylinder-head or end, or any portion thereof. And, Secondly, he claims adapting to the interior of stuffing-boxes a cup or lining, in which is placed the elastic or other packing, so that the said cup or lining, containing the packing, may be drawn up out of the stuffing-box when required.

To Robert Lucas, *of Furnival's-inn, in the City of London, mechanical draughtsman, for an invention of improved machinery to be used in the preparation of cotton and other fibrous materials for spinning.*—[Sealed November 13th, 1852.]

This invention of improved machinery, to be used in the preparation of cotton and other fibrous materials for spinning, has for its object, to coil rovings into cans or around rods, in such a manner that a greater quantity of roving can be pressed into the cans or around the rods than can be effected by the arrangements and machinery heretofore used for that purpose.

In the improved machinery the cans may, if required, be

made to rotate by means of any convenient mechanism; and, in addition to this motion of the cans, in some cases an oscillating, vibratory, or reciprocating motion is communicated to the delivering-rollers and their accessories, so as to cause the rovings to be coiled in the cans in concentric coils or loops, or in any other suitable manner, according to the peculiar arrangement and construction of mechanism that may be employed for actuating the various parts. In conjunction with these motions there is adapted to the inside of the cans a contrivance whereby the rovings are, from the commencement of the operation of delivering into the cans, subjected to a certain and constant amount of compression or condensation, instead of the rovings being compressed only at certain stages of the operation, as has heretofore been the case.

In Plate I., fig. 1, represents a front elevation of a series of cans, constructed and arranged upon the improved plan; some of the parts being shewn in section, in order more clearly to shew the construction of the internal parts; fig. 2, is a plan view of the same, as seen from above; and fig. 3, is another plan view, shewing the arrangement of gearing whereby the cans may be made to rotate on their centres. *a, a, a, a,* are the cans, into which the rovings are delivered from the feeding-rollers *b, b, b, b,* which are mounted in bearings *c, c, c,* on the plate *d, d, d, d.* This plate *d,* is mounted on the cranks *e, e,* one of which is placed at each end of the plate. The crank *e,* at the left-hand end of the apparatus, turns on a stud, fixed on the stationary frame-plate *f*; and the crank *e,* at the right-hand end of the apparatus, is fixed on the upper end of the vertical shaft *g,* which turns in bearings in the stationary frame-plate f^1, and the foundation-plate *h.* The shaft *g,* also carries, at its upper end, a bevil-toothed wheel *i,* which is driven by a similar wheel *j,* on the end of the driving-shaft *k*: the lower end of the shaft *g,* carries a pinion *l,* which drives the system of gearing *m, m, m, m,* whereby rotary motion is communicated to the cans *a, a.* Instead of this simple motion, the cans may, if preferred, be fixed on a plate, to which may be communicated a kind of circular reciprocating motion, by means of cranks, excentrics, or other equivalent mechanical contrivances. Inside the cans *a, a,* there is a vertical rod *n,* with a foot *o,* and a moveable disc *p,* through which the rod *n,* passes; this disc *p,* is furnished with a spring-clip, which embraces the rod, and will be thereby held thereon, at any point, until forced down by external pressure—as when a quantity of rovings is being delivered from the drawing or feeding-rollers.

It has been said that the plate *d*, is actuated by the cranks *e*, *e*; but, in order to communicate motion to the feeding-rollers *b*, *b*, horizontal bevil-wheels *q*, *q*, are mounted on the upper ends of the crank-pins, and drive the bevil-pinions *r*, *r*, on the ends of one of the shafts of the feeding-rollers, as shewn in figs. 1, and 2. By this means, as motion is not only communicated to the cans *a*, but also to the feeding-rollers *b*, *b*, the combined movements may be so arranged as to deposit the rovings in coils or loops, or in any other suitable manner, on the moveable disc or plate *p*, which, being furnished with a spring at its centre, will be made to descend on the rod *n*, as the rovings are coiled thereon. After a sufficient quantity of roving has been coiled round the rod *n*, in the cans *a*, the rod can be taken out and inverted into other cans or boxes. If thought desirable the usual cans may be dispensed with, and the rovings may be merely coiled round the rod *n*, in the same manner as just described; it will, however, then be necessary to employ a bell-shaped mouth or short can, as shewn at A, fig. 1. This bell-shaped can must be furnished with a door, so that, on opening the same, the condensed rovings, surrounding the rod *n*, may be removed from the apparatus, just as a full bobbin may be taken away from a roving or spinning-frame.

A modification of the plan above described may be made, by employing compound cranks to actuate the plate *d*, and impart the necessary compound motions to it; the cans *a*, or rods *n*, with their discs, in such an arrangement, being stationary.

Another modification may be made, by communicating to the cans *a*, or rods *n*, the requisite compound motions,—the plate *d*, being made stationary instead of moveable. Instead of actuating the cans or rods in the manner above mentioned, an undulating, swinging, or rocking motion may be communicated to them, by mounting them on pivots, and actuating them by cranks, cams, or other suitable mechanical contrivances.

The patentee states that he is aware that cotton and other yarns, or rovings, have been coiled in cans in a regular manner, by communicating to such cans a rotary motion on their centres; he does not therefore intend to claim any such contrivances, as constituting part of the present invention; but that which he considers new, and therefore wishes to claim, is the general arrangement of machinery or apparatus, herein shewn and described, or any mere modification thereof, whereby rovings may be coiled or deposited in cans or around rods, by means of an oscillating or reciprocating motion, communicated

either to the drawing or feeding-rollers, as shewn, or to the cans *a*, or rods *n*, as described. He claims, particularly, the employment and application, for the purposes herein set forth, of the moveable plate *d*, on which the drawing or feeding-rollers and their appendages are mounted. And he also claims the method herein shewn and described, or any mere modification thereof, for communicating motion to the several parts.

To François Vallée, *of Bruxelles, manufacturer, for improvements in preparing, spinning, and doubling flax, cotton, wool, silk, and other fibrous materials.*—[Sealed 16th November, 1852.]

The principal object of this invention is to spin "high numbers" or fine threads or yarns with greater ease and facility, and of greater strength than heretofore.

This is effected by constructing and operating the bobbins and spindles in an improved manner, and also in subjecting the thread, during the winding operation, to a process whereby the fibres may be consolidated and the strength of the yarn increased. On the upper end of the spindle is mounted a flyer, whereby the twist is given to the yarn; and as this flyer is required to be driven at very high speeds, the arms are enclosed in a ring, for the purpose of preventing them from spreading. The lower end of the flyer-spindle rests on a copping-rail or bar, and, by raising or lowering this bar, the thread, during the operation of spinning, is wound regularly on to the bobbin, which is placed on a tube, through which the spindle passes freely: the bobbin can therefore be held, so as to allow it to rotate at a given speed, while the spindle and flyer revolve at another speed, in order that the winding-on operation may be properly conducted. In order to regulate the rotation of the tube, on which the bobbin is mounted, there is a friction-pulley at the lower end thereof.

When it is required to strengthen and consolidate the rovings, they are made to pass from the spools, through a mucilaginous preparation or composition, or even through pure water, or in contact with a roller or cylinder covered with cloth or felt, which is kept damp by any convenient means.

The advantages claimed for the present invention are, that the differential motion of the spindles is dispensed with; the spindles, whether employed for the purposes of preparing, spinning, or roving, being made to rotate at a greater speed, and requiring less power to drive them than by the plans ordinarily adopted.

In Plate III., fig. 1, represents a vertical section of a spindle, with its bobbin and flyer, intended to be employed in the process of preparing; fig. 2, represents a side view, and fig. 4, a sectional view, of a spindle, for spinning and twisting; and fig. 3, is a sectional view of a flyer, detached, and intended to be employed for the same purpose. *a*, is the spindle, which is intended to be mounted in a step, on a copping-rail, and move up and down therewith; and *b*, is the flyer, screwed or otherwise fixed to the spindle *a*: the arms of this flyer may, if thought necessary, be surrounded by metal rings. Instead of this flyer, a cup-shaped piece, made of copper or other suitable material, might be mounted on the spindle. *c*, is a tube, made hollow throughout; and through it, the spindle *a*, passes, so as to allow this latter to turn freely therein. This tube is mounted perpendicularly in an aperture made for that purpose in the framing, and is fastened thereto either by means of an adjusting screw, or by a screw-bolt and nut: this tube *c*, rests upon, and is supported by, a shoulder at *f*. *g*, is a pulley or wharve, mounted loosely upon the shoulder *f*, and intended for the reception of the driving-cord, while the operative is mending a broken thread, or removing the spindle. *d*, is a hollow shaft, enclosing the tube *c*; its lower extremity works in a step in the shoulder *f*, of the tube *c*. This hollow shaft carries a pulley *h*, furnished with a small stud at the point *o*, which enters the bobbin *e*, mounted upon the moveable hollow shaft *d*. By this means the bobbin will be caused to rotate with the pulley *h*. The thread passes from the reel or bobbin through the eye of one of the arms of the flyer *b*, and by that means carries it round with it. By the copping motion of the spindle and flyer, the thread is wound evenly upon the bobbin *e*; the winding-on being effected by the resistance or drag of the spindle, the operation of which is regulated by means of a weighted cord bearing upon its lower extremity.

For spinning or twisting high numbers, it is advisable to enclose the arms of the flyer in a ring, (see fig. 2,) in order that the thread may not be forced to carry round the spindle, but may, if necessary, pass round this ring. The resistance necessary for the winding-on is obtained by means of crescent-shaped pieces of copper or zinc, or by any other suitable separation between each of the bobbins, upon which the thread is caused to bear, by which the rapidity of its motion is checked.

For spinning or twisting "low numbers," it is advisable to adapt to the top of the spindle a twistle, as shewn at fig. 3,

for the purpose of moderating the speed of the motion of the thread, and preventing it from winding on irregularly. This improvement may also be adopted for the preparation process with advantage; but the twistle may be employed or dispensed with, according to the quality of thread desired to be produced.

In order to impart strength to cotton yarns, the rovings are passed through a decoction of some mucilaginous substance, or even through pure water, by which the fibres are caused to adhere closer together. The same result may be obtained by causing the thread, on leaving the delivering-rollers, to pass over a roller which revolves in a vessel filled with water, and the circumference of which it slightly touches.

Instead of making the spindle *c*, hollow throughout, a hole might be made to a certain depth in its upper part, and a short spindle, carrying the flyer, inserted therein: in this case the copping motion would be produced by the bobbin instead of the spindle. The position of the flyer might also be reversed,—the head being below and the arms above; in which case the head of the flyer would work in the step of the tube *c*. To facilitate the revolution of the flyer, it might be made to turn on a pivot, in an aperture made for that purpose in the upper part of the spindle.

The patentee claims the general arrangement and combination of parts herein shewn and described, or any mere modification thereof; and he claims, particularly, the use and application of the hollow tubes *c*, and *d*, as shewn and described, whereby increased steadiness is obtained.

To HENRY RUSSELL, *of the City of Norwich, piano-forte maker, for his invention of improvements in piano-fortes.* —[Sealed 17th November, 1852.]

PIANO-FORTES have heretofore been usually strung with round or cylindrical wires; and, in order to obtain the requisite volume of tone, it is necessary that two or more strings or wires should be combined together, so that, when they are simultaneously struck with the hammer of the instrument, all the wires belonging to one note may give out the same tone with sufficient power. The employment of two or more wires or strings, to produce one note, necessarily increases the cost of the instrument, and the time and labor of tuning, as well as the liability of the instrument to get out of tune. The object of this invention is to obviate these defects; and, at the same time, increase the power of the instrument and im-

prove the quality of the tone. This is effected by employing flattened wire or metallic tapes instead of round or cylindrical strings, as is usually the case.

In Plate III., fig. 1, is a transverse vertical section of a piano-forte, strung upon the improved plan. *a, a,* is a metallic string-plate, secured in the ordinary or any convenient manner to the framing of the instrument. The strings *b, b, b, b,* it will be seen, are in the form of tapes or flat bands; and one end of these tapes or bands is twisted into the form of a loop, and properly secured by binding wire at 1. The looped ends of the bands *b,* are placed on the "pitch-pins" *c, c, c, c,* and the bands pass through horizontal slots in the studs *d, d, d, d,* which are screwed or otherwise fixed in the belly-bridge *e;*—these studs *d, d,* are shewn detached in fig. 6. The bands *b, b,* pass over and are forced down upon another set of studs *f, f,* by the pressure-bar *g.* The studs *f, f,* are screwed into the wooden framing of the instrument; and the pressure-bar *g,* is made to bear upon the tapes or bands by means of the screws *h, h,* which are also fixed in the wooden framing, but may be tightened up as required. The upper ends of the metallic tapes or bands *b, b,* are clamped or held between the jaws of lever-clamps *i, i;* one of which is shewn detached, and upon an enlarged scale, at fig. 2. Fig. 3, is a longitudinal vertical section, fig. 4, is a plan view of the same, and fig. 5, is an end view of one of these lever-clamps, which are fastened, at their inner ends, on the top of the wooden framing, by means of screws *j, j,* as shewn at fig. 1,—a little play, however, being allowed them for the purpose hereinafter explained. The outer ends of these lever-clamps project over the wooden framing, and lie between projecting pieces of the guide-rack *k, k. l, l,* figs. 2, 3, 4, and 5, are moveable steel jaws, the faces of which are roughened like the face of a file. These jaws are inserted in a slot made in the lever-clamp, and are prevented from falling out by horizontal cross-pins, which rest on the top of the clamp, as shewn in figs. 3, 4, and 5. The bands *b, b,* are drawn up between these steel jaws, which are forced tightly against it by means of the clamping-screw *m,* for the purpose of preventing it from slipping, when tension is applied during the operation of tuning. In order to tune the instrument, it will only be necessary to turn the vertical screw *n,* which bears against a steel or metal bar *o,* on the top of the framing; and as the screw *n,* is turned, it will, of course, raise that end of the lever-clamp *i,* and increase the tension of the metallic bands to any desired extent,—the opposite ends of

the lever-clamps being only loosely secured to the framing, in order to admit of a little motion in a vertical direction.

The patentee claims the use and application to piano-fortes, as herein shewn, of flat metallic tapes or bands in place of round or cylindrical wires.

To Joseph Henri Combres, *of Rue des Pretres, in the City of Paris, for preventing the ill effects of dampness in walls and dwellings.*—[Sealed 24th November, 1852.]

This invention has for its object, to prevent damp or humidity from passing through from the outside, or from the foundations, to the inner surface of walls, and injuring the face thereof, or any decorations, objects, or things, that may be placed on or against the face of these walls. This end is effected by the employment of sheets or plates of glass, combined with other materials, and properly prepared, in the manner hereafter explained, and adapted to and fixed against the walls or surfaces, so that they may be ornamented with any devices that may be desired.

For these purposes it is preferred to use sheets or plates of glass, measuring about 17 inches by 20; but any other convenient size may be used. These sheets or plates of glass are to be covered with unbleached calico, linen, or any other suitable material, secured to the walls by means of nails (such as are used by slaters), together with bands of thin sheet lead. The joints between the sheets or plates are filled with painters' putty and cement. The sheets or plates of glass being ready, the calico, linen, or other material, with which they are to be covered, is cut into pieces, according to the dimensions of the sheets or plates of glass. This linen or calico is then soaked in a solution of very clear glue or paste, for two hours, at least, and afterwards laid with great nicety on the glass, and left to dry. When the covering becomes dry, the sheets or plates of glass are painted over with a brush, with a composition composed as follows:—To 50 parts of linseed oil add 50 parts of essence of turpentine, 5 parts of litharge, in powder, and 5 parts of yellow ochre, ground in oil; well mix the whole, and make it a liquid preparation, suitable to be laid on with a brush, for giving a strong coat on the surface of the sheets or plates of glass, when covered with the calico, linen, or other material. The sheets or plates of glass, thus prepared, with the calico, linen, or other material, may then be fixed on the wall, in the following manner:—The outline of the first sheet or plate on the wall is traced, and the lead is nailed on for

attaching the sheets or plates to the wall; the heads of the nails being within the outline, and at a short distance (say from ⅛ to ½ an inch) from the angles. Three of the edges of the sheet of glass are then covered with strips of painters' putty, leaving free the upper edge of this sheet, in order to introduce a certain quantity of fine sand. In applying the sheet or plate to the wall, it is necessary to support it in all its parts, so as to allow only an interval of about the twentieth part of an inch between the sheet or plate and the wall, to admit of the sand. The lead bands are then partly divided with one or two slits; the one half is laid down on the sheet already fixed, and the other half is left to be laid down on the sheet which will be fixed at the side: the part of the glass covered with the calico or other material must always be placed outside. The remaining sheets of the first course are then fixed in the same manner. The first course being fixed in its place, and the bands being well attached, the sand is then introduced between the wall and the sheets of glass.

The upper courses are fixed in the same manner; and when the part of the wall to be covered with the sheets is completed, the joints must be coated over with mastic, for the width, at least, of the bands, and their full thickness. When the joints are dry, the surface of the plate or sheet must be covered with the mixture hereinafter mentioned, which must be laid on with a trowel or other suitable tool, so as to obtain a perfectly smooth surface. The surface is then ready to receive all kinds of painting or decorations, and mouldings, plinths, and other embellishments, can be nailed on or otherwise attached, without doing any injury to the work.

The cement above referred to, for covering the joints, is composed as follows:—Take 20 parts of white-lead, ground in oil, 20 parts of glaziers' putty, 5 parts of clear litharge, and 5 parts of minium, in powder: mix these together with white chalk or whitening, to render it like painters' putty.

The mixture or mastic above referred to, for coating the sheets of glass when fixed on the wall, is composed as follows:— First, pound painters' glue and heat it, and when very hot infuse in it chalk or whitening, so as to obtain a sufficiently thick paste to be laid on with the trowel; then add thereto a suitable quantity of linseed oil. The first layer of this cement is put on pretty thick, to hide the fastenings and joints; and when this is dry another coat is laid on, to obtain a perfectly smooth surface.

The patentee claims covering walls or surfaces with sheets or plates of glass, as aforesaid, for the purpose of preventing humidity or dampness from passing through the same.

To Diego Jimenez, *of Percy-street, London, merchant, for improvements in the manufacture of soap.*—[Sealed 5th October, 1852.]

This invention relates, firstly, to a mode of manufacturing from any given quantity of grease, or oleaginous matter, a larger quantity of soap than can be produced by the ordinary system of manufacturing soaps by boiling. This result is effected by an improvement in the mode of preparing the leys; in consequence of which preparation it is possible to combine with the oil, grease, or fat used in producing the saponaceous mixture, a greater proportion of alkali than can be done in other modes of soap making. The soaps, thus obtained, are said to be of a superior quality, to be cheaply produced, and also to posses great cleansing power, which renders the use of soda, with them, unnecessary. In addition to these advantages, the hard soaps obtained by this process are harder than those made in the ordinary manner; and they are not subject to so much loss of weight by keeping.

This invention relates, secondly, to the making of soaps by a cold process instead of by boiling; that is to say, in consequence of the prepared leys, and the oleose or fatty matter being put in reaction at certain fixed quantities, in being able to mix, combine, and convert them into soap, at a temperature not exceeding 33° to 35° Centigrade (91° to 95° Fahr.),—the soap being immediately formed by admixture of the components; thus giving a great economy in labor and time.

This invention relates, thirdly, to a mode of obtaining, by the combination of the prepared leys and the oleose or fatty matter, by a cold process, or at a heat not exceeding 33° to 35° Centigrade (91° to 95° Fahr.), from 200 up to 600 parts of soap for every 100 parts of grease or oil employed. Also in obtaining the same large proportions of soap by boiling, if required; which quantities cannot be obtained by the usual methods of soap making or boiling, excepting the leys be purified and prepared in the manner herein stated.

Hard Soaps.

The leys are formed by extracting them from natural barillas, or from artificial carbonate of soda. these substances give the leys for the formation of hard soaps (the leys for soft soaps being obtained by dissolving, in water, the alkaline salts contained in the ashes of non-marine vegetables). Both the natural barillas and the artificial carbonate of soda are

triturated until they are reduced to small particles; and, when in this state, a certain quantity of quick-lime is mixed with the mass, in proportion to the quantity of carbonated alkali contained in the barilla or artificial carbonate of soda, or in the solution from the ashes mentioned above. The quantity of alkali contained in the barilla or carbonate of soda, or in the solution from the ashes, having been previously ascertained by an ordinary alkalimetrical experiment, the proportion of lime to be added to the mass is calculated according to the chemical equivalents of the carbonate of soda (or potash, if the alkali has been obtained from wood ashes).

The mixtures having been prepared as stated, all the salt contained in the ashes, soda, or barilla, is completely extracted from them in water, and the leys, so obtained, are concentrated by heat, in iron boilers of any shape, until the solutions of caustic alkali mark 37° on Beaumé's areometer. The leys which are obtained from the ashes of non-marine plants or vegetables, are only to be concentrated until they mark 31° on the areometer. In this state the leys are taken from the boilers and left to settle and cool. In this process of soap-making the patentee makes use of carbonated leys obtained from barilla or artificial carbonate of soda by the same operations or means as the preceding ones, with the only difference that no lime is put to the barilla or artificial soda, and that the leys are concentrated until they mark only 29° on the said areometer of Beaumé. The carbonated leys, in this state, are fit for use; but, with regard to the caustic leys, it is necessary to prove and examine them, and be fully convinced of their perfect causticity, as, if it should be found that they contain any carbonic acid, more lime must be added, from time to time, in certain proportions, until the decomposition of the alkaline carbonate be fully effected. If, in the preparation of leys from soda, use is made of the salts extracted by the makers of artificial soda, such salts being true carbonates, lime is added in accordance with what is already stated, in order to obtain completely caustic ley.

The leys obtained from soda, prepared in the way stated, are combined with the greases or oleose matter in three different proportions; but it must be understood, that the leys at 37° on the areometer of Beaumé, which are obtained from natural barilla, contain about 23.31 per cent. of oxide of sodium, whilst those obtained from artificial soda, with the same areometric weight, contain only about 20 per cent.; for which reason two distinct series or proportions of combinations are employed.

The proportions in which the first series, or the leys extracted from natural barilla, are to be used, are, first proportion, 46.48 of the caustic alkaline solution at 37°, to 100 of grease or oil; second proportion, 92.96 of the ley to 100 of grease or oil; third proportion, 139.44 of the ley to 100 of grease or oil. The proportions of the second series, or those in which the leys extracted from artificial soda, are to be used, are, first proportion, 54.17 of caustic ley, at 37°, to 100 of grease or oil; second proportion, 108.35 of the ley to 100 of grease or oil; third proportion, 162.52 of ley to 100 of grease or oil. Comparing the two classes of leys or caustic solutions of soda, obtained from natural and artificial soda, the same quantities of oxide of sodium will be found contained in 46.48, 92.96, 139.44, of the leys, which proceed from natural barilla, as in 54.17, 108.35, 162.52, respectively, of the leys which are obtained from artificial soda.

These three classes of soap are made in a cold state, or at 33° to 35° Centigrade, in the following manner:—The oils or greases, and the leys, are first brought to the indicated temperature of 33° to 35°, and, in this state, they are completely mixed together. As soon as the two bodies or substances are in intimate combination, the saponification is effected. The result of this operation is a not very firm and consistent mass of soap, which, in this state, may be passed to the moulds or frames in a stove-room, at the temperature of 20° to 25° Centigrade; and it goes on progressively increasing in hardness or solidity, so that, in ten days, it is in a fit state for use. This mode of proceeding comprehends the three classes or distinct proportions of soap above mentioned; but the improved system or method is not limited to the employment of the leys with the oils and greases in the proportions mentioned only; as, after the mixture has obtained a certain consistency, carbonated ley, at 31° areometer (Beaumé), is sometimes added, in the manner following:—The caustic ley and oil, in either of the three proportions already given, is put together, and kept in motion by beating or stirring for the space of fifteen minutes; by which time, more or less, the substances, which were in a liquid state, will have arrived at or taken a consistency similar to a thin jelly; and, whilst in this state, a quantity of carbonated ley, equal to the half of the oil employed, is added, and the whole is again in motion by beating or stirring it for fifteen minutes more; by which time the soapy mass will acquire the consistency it had before. The additions of ley are repeated in the same order until the whole is composed of 600 parts; that is to say, 100

of oil and 500 of caustic and carbonated ley. The mixture is then put in a stove-room, at 20° to 25° Centigrade, if the temperature is low; but, in summer, the atmospheric heat alone will be sufficient; and in ten or twelve days it is fit for use. It must be borne in mind that the oil, in order that it may combine with the above-mentioned quantity of leys, must not be oxygenized; but tallows and solid fats, even if they are not oxygenized, will not admit, in combination, so large a quantity of leys as above mentioned. The soaps thus made in a cold state, with these large proportions of alkali, are employed, after they have become hard, for making soaps with a mixture of rosin. To effect this, the soap is divided into small fragments and boiled with 6 per cent. of water and from 2 to 10 per cent. of rosin. When the soapy mass is rendered homogeneous by boiling, and it is apparent that all the water that was added has been evaporated off, it is taken from the fire and put into moulds in a cool place, and, when cold, it is fit for use. In order that sufficient heat may penetrate the masses when in the stove-room, the moulds for hard soaps should not be more than 96 inches long, 24 inches wide, and 18 inches deep, more or less; which size will give, approximatively, 15 cwt. of soap. If the moulds be of less proportions than above mentioned, it will cause much inconvenience in dividing the soap into bars, &c.

Soft Soaps.

For the formation of these soaps, the caustic leys are obtained from the ashes of non-marine vegetables in the usual way, and concentrated until they mark 31° on Beaumé's areometer, as already stated. Of this solution of caustic potassa, soft soap is formed, by mixing it with the oils or greases in the manner following:—To 100 parts of oil, tallow, or solid fat, 100 parts of the said ley are added, and the mixture is kept in motion until the two substances are perfectly mingled together. After remaining quiet for an hour, the mixture is again stirred several times and then left till the following day; by which time the soapy mass will have attained sufficient solidity or firmness. A second quantity of ley, equal to that of the previous day, is then added, and the same operations are gone through. These additions, with the process of beating or stirring together, are repeated in the same order until the mass consists of 500 parts or more by weight. A similar effect to that just described is also produced by using, in the place of the caustic ley, the carbonated ley, at 31° Beaumé, such as is added to the hard

soaps; with this difference, that the ley is concentrated to 32°, or the degree of crystallization. These operations are carried on in a stove-room, heated to from 33° to 35° Centigrade.

The patentee claims, First,—the mode herein described of preparing the leys, and the combination of such prepared leys, in the proportions above set forth, with oils and fatty matters. Secondly,—the production of a neutral compound by the admixture of caustic and carbonated leys with the greases, as stated. Thirdly,—the making of soaps by the cold process, or at a temperature of from 33° to 35° Centigrade, as hereinbefore described. Fourthly,—the application of the specified improvements to boiled soaps, produced by the usual method of soap making, or by boiling the soaps made by the cold process, and the addition of rosin thereto, as may be required. And, Fifthly,—the application of the specified improvements to hard white, mottled, and yellow soaps, and soft soaps.

To Freeman Roe, *of the Strand, London, hydraulic engineer, for improvements in valves and cocks.*—[Sealed 1st October, 1852.]

This invention has for its object, first, improvements in cocks where ball-valves are used. These improvements consist in attaching rods, which slide freely through stuffing-boxes, to the ball-valve, so that the valves may be pushed from their seats by pressure; and when released, the pressure of the fluid on the valves will force them back again into their seats, and thereby avoid the necessity of using screws to effect that object.

In Plate III., fig. 1, represents an ordinary draw-off or bib-cock, with a lever and counter-balance attached thereto; and fig. 2, represents, in section, a ball-valve for regulating the supply of water to cisterns. The ball *a*, pulls down the spindle *b*, as the cistern becomes empty; but, as the cistern fills, the ball *a*, floats upwards, and liberates the spindle *b*, which causes the ball-valve *a**, to rise to its seat *c*, and cut off the supply. The second part of the invention relates to arranging valves or cocks for supplying the pans of water-closets, or other vessels, with a measured quantity of water, and consists in arranging the outlet-valve, so that it will let out the water from a box, when the pressure from the water coming in is shut off. Fig. 3, represents a water-closet basin *d*, supplied by a box *e*, which may be fixed in any situation: this box is

supplied by the cock or valve *f*, in which the spindle *g*, is pressed down by the seat, or by hand, or any other means. As soon as the said spindle is released, the valve *h*, floats (its specific gravity being lighter than water), and allows the water to escape into the basin. Thirdly, the invention relates to sluice-cocks or hydrants, and consists in forming dovetail grooves, recesses, or narrow openings, in the working parts of such cocks or hydrants, for fixing the seats of the valves, and casting or fixing therein, gutta-percha, or metal of a different kind to the body of the valve (when a facing of another kind is required), so that the gutta-percha or metal will produce a fixed working surface. In the present plan, it is often necessary to cut out the old valve, and replace it with a new one; but, by these improvements, the valves or seats may be readily removed, and refaced when required. Fig. 4, represents a section of a sluice-valve; *a*, *a*, are the seats; *b*, *b*, shew the dovetails or grooves into which the gutta-percha is fixed; *c*, is the valve, double-faced, through the body of which the screw passes, to enable the valve to be opened or closed at pleasure. Instead of the flanches, by which the bonnet of the valve is attached, being at *a**, they are fixed at *b**, which comes directly in a line with the main-pipe. Fig. 5, is a ground-plan of the valve, with the bonnet taken off, shewing the recesses or grooves *d*, *d*, into which the seats are slid; consequently they are easily removed for repairs, &c. Fig. 6, shews one of the seats taken out; *e*, being the projecting part, of gutta-percha or metal; and *f*, *f*, the rebate, which slides into the recesses or grooves *d*, *d*, shewn in fig. 5. Fig. 7, shews the top edge of the seat; and fig. 8, shews a section of a valve in a box, the flanch being grooved to receive the valve; *g*, *g*, is the recess or groove, with the valve seating fixed therein; *h*, is the valve, in its place; and *i*, *i*, is the dovetail groove to receive the gutta-percha or metal. It will be seen, therefore, that by first detaching this valve from the flanch of the pipe *k*, the seat of the valve can be readily removed.

The patentee claims, Firstly, a moveable spindle, as described, in connection with a ball-valve. Secondly,—the arrangements of the valves to supply water-closets, &c. Thirdly,—the facing, together with the general arrangements and combination of the whole; so that the faces can be taken out to repair, by removing the bonnet of the valve. And he also claims the mode of arranging and facing valves, and parts, as shewn in fig. 8.

To John Henry Gardner, *of Poppin's Court, London, for improvements in toilet tables.*—[Sealed 1st October, 1852.]

This invention consists in so constructing or combining parts of a table that the upper surface will fold or open in parts; the under surfaces of the parts being fitted for receiving instruments. Below the upper surface of the table is a looking-glass on a stem, which descends into, and can be raised in the leg or standard of the table. Below the glass, the table is fitted to receive brushes, razors, and other instruments.

The pillar of the table is hollow, and at its exterior and foot may be of any desired form or device. At the upper part of the pillar the table is fixed; and it may be square or of other form, and hollow to such a depth as will admit of its containing the various instruments, brushes, scent and other bottles, and other articles proper for furnishing a toilet case. The upper surface of the table is composed of two parts or flaps, which are respectively hinged to the upper parts of the table; and the interior surfaces of these folding covers are fitted up with suitable and ordinary well-known means for receiving boot-hooks, scissors, knives, and other instruments and articles; so that, when the table is open, the two parts form, as it were, wings or additions, each containing useful articles. In the pillar of the table a stem slides, which, at its upper end carries a looking-glass; the frame of which is of a size and form to enter into the hollow part of the table, and cover the articles therein—such as brushes, combs, scent and other bottles, and also other articles suitable for furnishing a toilet table. The stem, which carries the looking-glass, slides freely in the pillar; and it is preferred that such stem should be cylindrical, in order that it may be turned round, so that the looking-glass may be caused to face in any desired direction. In order that the looking-glass may be raised and turned to any required position, and retained there, a set-screw passes through the pillar of the table; or the stem of the looking-glass may be retained in any position it may be raised to, by means of a spring or other catch or stop. The looking-glass is hinged to the upper part of the stem, and is to move sufficiently tight on the hinge (which is fixed to the back of the looking-glass), that the looking-glass may remain at any angle to which it may be set. The interior space in the table (under the looking-glass when it is down) is fitted up in like manner to other dressing-tables and cases; that is, with brushes, combs, scent and other bottles, and other articles, which, when the

looking-glass is in a horizontal, and at its lowest position, are covered by the looking-glass, and the looking-glass will be covered when the two parts of the top of the table are shut.

The patentee claims the mode, herein described, of combining the parts of a toilet table.

To THOMAS TRUEMAN, *of Swansea, for improvements in obtaining copper and other metals from ores, or matters containing them.*—[Sealed 7th October, 1852.]

THIS invention consists in acting on oxide ores (or sulphuret ores after they are reduced to oxides by calcination) by digesting them in acids, and afterwards applying muriate of lime, and lime. If sulphuric acid be used for extracting copper from the ore, the copper alone will be dissolved, and may be drawn off; leaving sulphate of silver, which is to be washed out by hot water, and added to the sulphate of copper previously run off. Common salt, or muriatic acid, is to be added to this solution, to throw down the silver as a chloride; the solution of sulphate of copper is then to be run off, and muriate of lime added to it to form muriate of copper, and a precipitate of sulphate of lime. The muriate of copper, thus formed, is to be run off, and lime added to it, to throw down the copper in the form of oxide; leaving muriate of lime in solution, which is to be again used for the previous process. The oxide of copper and chloride of silver are to be treated, in the usual way, to obtain the metals. The residue in the first tank, after the copper and silver solutions have been drawn off, is to be boiled in a solution of caustic alkali to extract the oxide of tin; which may be obtained from the caustic solution by various means; or the residue may be smelted, in the usual way, to obtain metallic tin. If muriatic acid be used, the copper alone will be dissolved out, and may be at once treated with muriate of lime, and lime, as before stated;—the chloride of silver, left in the first tank, to be dissolved out by a hot solution of common salt, or of hyposulphite of lime; from which the silver may be obtained by various means: the residue is to be treated as before. If nitric acid be used, both silver and copper will be dissolved. The silver may be obtained by the addition of salt, or muriatic acid, the same as from the sulphate of copper solution. The copper is to be thrown down from the solution by soda or potash, forming a solution of nitrate of the substance used;

and the solution may be evaporated to obtain crystals: the residue, in the first tank, is to be treated as before. Some of the slags, obtained in the methods of copper smelting now in use, are proposed to be treated in a similar manner; that is, by digesting them in acid.

Carbonates of copper may also be treated in a similar manner, with or without calcination,—that only being necessary when other metals are present which it is desirable to separate from the copper. By the calcination some will be peroxidized and rendered less soluble in acids, and others will be drawn off: two or more acids may be used together,—the after treatment being varied accordingly.

In the treatment of sulphuret ores, the ore is to be ground to fine powder and calcined, at a gradually increasing heat, for about twenty-four hours, in order to drive off the sulphur. It is necessary to keep it at a good red heat for the last six hours, which will have the effect of peroxidizing any iron and tin that may be in the ore: the sulphur should be driven off as completely as possible, and also the arsenic and antimony, if there be any in the ore. In some cases it may be found necessary or convenient to partially calcine the ore before grinding it to powder; in which partially calcined state it is more easily ground; and, after grinding, may be calcined to finish the operation. When the calcination is completed, the ore is to be removed to tubs or vats, or other suitable vessels, and acid added in proportion to the quantity of copper and other metals to be acted on contained in the ore;—the proportions to consist of one equivalent of acid to one of copper in the ore, and an additional quantity of acid to act on the silver, if any be present in the ore; water is then to be added to the ore and acid in the vessel, so as to make an equal or greater weight of water and acid than there is of ore; the whole is then to be boiled, and well stirred during the operation. The boiling should be continued for several hours; at the end of which time the ore may be allowed to settle, and the supernatant solution drawn off into a tank, which may be called No. 1. Fresh water is then to be added to the ore, to wash out all the copper, and this washing may be added to the solution first drawn off. If the sulphuric acid has been used for acting on the ore, the water used for washing is to be hot, if it is desired to obtain silver from the ore: by the use of hot water the sulphate of silver, previously formed, will be dissolved. This solution may be added to the first portion drawn off; and to it must then be added a

muriate (common salt or muriatic acid are the most suitable), sufficient to precipitate all the silver; which may be allowed to remain at the bottom of the tank till a considerable quantity has accumulated. When the precipitation has taken place, the solution containing copper and perhaps a little iron, is to be drawn off into another tank, No. 2, and chloride of calcium is added; which will throw down sulphate of lime, leaving chloride of copper in suspension. This solution is drawn off into another tank, No. 3, and milk of lime is added thereto to throw down the copper as an oxichloride: the solution and precipitate, in this tank, should then be well boiled, to concentrate the precipitate; after which the liquor may be drawn off and used for the previous operation.

The precipitate of oxychloride of copper may accumulate in the bottom till it becomes a foot or more in thickness; and it should then be removed, dried, and fused with carbon, to obtain metallic copper. The chloride of silver in No. 1 tank, when a sufficient quantity has accumulated, may be treated in the usual way, to obtain metallic silver.

If, after boiling the ore with acid in the first vessel, and washing it with water, copper should then remain in the residue, a further quantity of acid must be added and the boiling repeated. When all the copper has been obtained, the residue, if containing tin, is to be washed with water,—allowing the particles to arrange themselves according to their specific gravity; the oxide of tin being heavier, may thus be obtained nearly free from oxide of iron and earthy matters, and may be reduced by carbon in the usual manner. The residue in the first vessels may be treated with a strong solution of caustic alkali, for dissolving out the oxide of tin; which may be obtained from the solution by the addition of a large quantity of water. This treatment, or that of washing, may be used so as to arrange the particles according to their specific gravities.

The acid preferred to be used is muriatic, which may be employed in the following manner:—If silver is in the ore the acid should be sufficiently diluted to prevent the chloride formed from being dissolved, as it should remain in the first vessel with the residue. The chloride of copper, formed at the first boiling and washing of the ore, after being run into No. 1 tank, may have milk of lime added at once; and after boiling in this tank, the solution of chloride of calcium may be allowed to run to waste; or, if found of commercial value, it may be crystallized. The precipitate of oxichloride is to be treated as before directed.

The residue in the first vessel, if containing silver, is then to be treated with a hot solution of common salt, or hyposulphite of lime or soda,—the latter salt being preferred; from which, after the solution has been drawn off into another tank, the silver may be precipitated, by placing in the solution pieces of iron or other suitable metal. The residue may now be treated as before for tin. "Nitric acid may be used as well as either of the former acids; the solution of copper with which is to be precipitated by potash or soda; which solution, being drawn off from the precipitated oxide of copper, is to be evaporated and crystallized to obtain nitrate of soda or potash."

As the silver will have been dissolved in the first vessel by the use of pure nitric acid, it is advisable to use a very little muriatic acid mixed with the nitric, which will cause the silver to remain in the first vessel with the residue; which is to be treated as directed when muriatic acid has been used.

The slags produced by the present methods of copper-smelting are proposed to be treated in the same way as ore. The slag is to be ground to a fine powder, and cleaned in the same way as the ore; so as to oxidize the various metals which it contains: the subsequent treatment will be the same as with ore.

Carbonates and oxides of copper may be treated in the same way, either with or without calcination; that only being necessary when other metals besides copper are contained in the ore, and are required to be separated therefrom.

Although the chloride of silver is proposed to be separated from the residue by a solution of common salt, hyposulphite of lime, or soda, the separation may also be effected by the use of mercury, as is well known. The copper may also be precipitated from its solutions by the introduction of another metal, such as iron or zinc.

The patentee remarks that he is aware that acid has before been used to separate small quantities of copper from tin ores; he does not therefore claim the same; but what he claims is, the mode, herein described, of separating copper from copper ores and slags; and he also claims the application of earthy and alkaline hyposulphites for dissolving chloride of silver.

Scientific Notices.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

April 27th, 1853.

A paper was read by Mr. WILLIAM C. CRAIG, of Newport,—

"On improved India-rubber springs for railway engines, carriages, &c."

In order to explain the difficulties which have been contended with and surmounted by the use of these springs, the condition of the roads upon which they have produced such satisfactory results has to be noticed, and the causes which first led to the introduction of India-rubber as a substitute for steel, in bearing springs, buffers, and draw springs.

The Western Valleys Lines of the Monmouthshire Railway and Canal Company (upon which the writer is locomotive superintendent), consist of twenty-five miles of tramway, exclusive of branches, and worked by heavy coupled engines of the most improved construction. The tram-plate is laid by means of chairs upon transverse sleepers, about 3 feet apart, and an intermediate sleeper at the joints. This plate, although heavy (about 73 lbs. per yard), is of very weak section, and there is, consequently, considerable deflection in it, a tendency to rise at the joints, and for the sleepers to work loose: the effect of this is, to cause a much greater expenditure of power necessary to overcome a series of rising and falling gradients, than would be the case upon an edge rail; and an undulatory motion of the engine is caused, which is extremely destructive to the steel springs hitherto in use on this line. The curves are also unusually sharp, (some being under five chains radius, and the majority under twenty chains,) which is productive of a prejudicial effect on the wheels, buffers, and other parts of the engines, carriages, and waggons. The gradients are very heavy, (some being 1 in 54,) producing a much greater strain on the draw-bars and couplings than is to be met with upon ordinary railways.

Upon such a road, the inconveniences attending the use of steel springs were both numerous and formidable. In addition to the continual repairs which were required by the springs themselves, the injury done to the permanent way, arising from the unequal action of the spring, and the violent concussions they were subject to, when they were totally disabled (as was frequently the case), was large in amount, and of continual occurrence, and of a character that involved considerable expense in repairs. Some idea of the damage thus occasioned may be formed, from the fact of the wheel tyres requiring to be replaced

at least every eight months, having become worn by that time into a series of flats, more nearly resembling an irregular polygon in outline than the circumference of a circle.

The engine tyres used on the tramways are steeled on the wearing surface. With regard to the springs themselves, it may be proper to mention here, that the item of expenditure for steel springs (including wages for repairing them) was £251. 9*s*. 9*d*. in six months, for fifteen engines only.

Such, then, were the circumstances when it was deemed necessary to test the application of India-rubber to the various purposes before mentioned, and the results have been attended with such marked success, as to exceed the most sanguine anticipations entertained.

The India-rubber springs described in this paper are constructed on Mr. Coleman's plan; one form of which as applied to engine-bearing springs, consists of a cylinder of prepared India-rubber 9 inches long and 9 inches in diameter, with a hole through it of 1¾ inch for the spring pin; it is supported by a wrought-iron plate 1⅛ inch thick, which rests on a shoulder on the spring pin, and is covered by a wrought-iron plate and cross-bar, through which pass the spring links attached to the outside framing at the bottom, and secured by set and jam nuts at the upper end. The India-rubber is prevented from undue lateral expansion by two ⅝-inch round iron hoops, and from internal compression and friction on the spring pin, by a helical coil of strong wire;—instead of this wire, wrought-iron ferrules are now used. To obviate an inconvenience which has been occasionally complained of, in passing over unusually rough portions of the road, viz., the jumping motion of the engines, from the great elasticity of the springs, it was found necessary to insert between the bottom plate and the top of the framing, another smaller cylinder of India-rubber, for the purpose of absorbing the recoil of the spring, and to prevent any motion being re-communicated from the spring to the framing. This had the desired effect, and the engine was found afterwards to run uniformly steady, at all varieties of speed, and however great the inequalities of the road.

Upon engines with inside framing, or where sufficient space for the springs could not be obtained, two cylinders, or sometimes three, were used.

In the application of the same description of spring to a tender, the India-rubber is 6½ inches diameter, 7 inches long, with a 1¾-inch hole, and bears against a cast-iron bracket bolted to the framework of the tender,—the bottom plate being supported by a set nut on the spring pin, which passes loosely through a hole in the under side of the bracket, and rests on a wrought-iron plate, ⅝ inch thick, made to fit in the top of the axle-box.

A similar arrangement may likewise be applied to waggons. the passenger carriages, two of these springs are used in pairs, ler to obtain a greater amount of elasticity, without increas-

ing the distance between the centre of the axle and the sole bar, and a modified form of axle-box is introduced, to meet the requirements of the double cylinder of India-rubber. No horn-plates are used in this case;—their place being supplied by two guide-rods, which pass through the axle-box and India-rubber cylinders, and are firmly bolted to the sole bar by jaws on the upper ends, and kept in their places by diagonal stays at the lower ends. The axle-box is cast with a projecting hollow wing on each side, which is enlarged on the top, to afford a bearing for the bottom of the India-rubber cylinder, and leaving a capacious grease-box between them. The upper ends of the India-rubber cylinders are received into a cast-iron plate, fixed to the sole-bar; and the arrangement of internal coil, or ferrules, and external hoops, is the same as previously described, with this exception, that one binding hoop only is used on each cylinder instead of two, in the case of waggons,—rather greater elasticity being required for carriages. Some new passenger carriages, with this description of spring, are now in use on the Monmouthshire Railway.

The present improved form of engine-bearing springs is termed the "hydro-pneumatic springs." The object of this form is to obtain the same amount of elasticity with a less quantity of India-rubber, and is accomplished by thinning the cylinder of India-rubber internally; and, in the increased space thus obtained, placing a quantity of fluid—water is used for this purpose—which, acting by hydrostatic pressure, distributes the pressure equally over every part of the internal surface; thus obtaining a much larger bearing surface than if the pressure were confined to the ends, and in fact producing precisely the same effect as a solid homogeneous cylinder of India-rubber. The fluid does not entirely fill the cavity in the India-rubber, at least not when first put in, but is adjusted to do so only on the spring receiving the maximum of impact: the air at the same time, which had before occupied the space left vacant by the fluid, retires into a chamber for that purpose in the upper part of the casting, and being then in a state of considerable condensation, exerts a powerful elastic force, assisting the spring to regain its equilibrium. The air and fluid are prevented from escaping under the ends of the India-rubber cylinder, by that part of the casting which receives them being cast with a groove; so that on the application of pressure, the India-rubber forces itself into the minutest crevice, and a perfectly tight joint is obtained without the necessity of interposing any other substance.

A spring, on this principle, is applied to waggons, being of very simple construction, and one that requires no alteration of horn-plates or axle-boxes; but which, with very little labor, may be applied to any existing waggon adapted for steel springs.

The same spring is applied to some new engines now being made for this railway. In this case the spring is entirely beneath the foot-plate, in a hollow part of the framing, immediately

above the axle guides, by which great compactness is obtained with increased strength of the frame. The internal arrangement is the same as the hydro-pneumatic spring; but the spring piston is cast in one piece with the axle-box; thus avoiding the necessity of using a spring pin, and at the same time dispensing entirely with suspending links, nuts, and bolts,—thereby still further reducing the total weight of the spring, which in this case is brought to a minimum.

In constructing buffers the elasticity of a cylinder of India-rubber is combined with that of a column of enclosed air. No fluid is used in this case,—the position of the buffer and its mode of action not being favorable to its use: neither is it required; as buffers should be sensitive,—more so than would be the case were fluid used. Transverse pins, rivetted to the external or wrought-iron cylinder, serve to confine the fixed and moving part of the buffer, and pass through slots in the plunger to allow them sufficient play. In a cheaper form of this buffer, the external wrought-iron case is replaced by a cast-iron one, for use where not liable to severe cross strains; the first form referred to being only for extra strong buffers.

Draw springs, for the buffer plank of an engine, and for common waggons, are constructed on the same principle, and only differ in their form and getting up.

The advantages resulting from the use of these springs may be thus enumerated:—1st, Reduction of dead weight. This item is more extensive than appears at first sight, since the reduction of weight is not confined to the springs themselves, but extends, in a greater or less degree, to a variety of other parts of the engine, carriage, or waggon, on account of the smoothness of their action. This is particularly advantageous in the case of cast-iron, whose liability to fracture consists, not so much in the weight it has to carry, as its inability to resist strains, jerks, and concussions; these are, however, nearly altogether deadened by the use of these springs; so that a motion uniformly smooth and steady takes the place of one that is very injurious to railway plant, especially to engines; and as the working portions of an engine are made extra strong, with a view to resist the concussions they are subject to with steel springs, it follows that when these are no longer allowed to operate, they may be made lighter without in the least impairing their efficiency. The reduction in the springs themselves is, however, considerable; and the weight thus gained is valuable, particularly in the case of waggons, where it becomes available for tonnage. The amount of this reduction of weight varies, as shewn by the following table; but may be taken on an average at from 3½ to 5 cwt. per engine, and the same for waggons.

Comparative Weight of India-rubber and Steel Springs.

Weight of Springs.	India-rubber.	Steel.	Reduction in Weight.
Engine-Bearing Springs.	Cwt.	Cwt.	Cwt.
India-rubber, 1¾ cwt.................................. } Iron Work, 3 cwt.................................... }	4¾		
Steel Springs taken off..........................		8½	4¾
Engine Hydro-Pneumatic Springs.			
India-rubber, 1 cwt. .... } Iron Work, 6 cwt.................................... }	7		
Steel Springs taken off..........................		8½	1½
Tender-Bearing and Draw Springs.			
India-rubber, ¾ cwt. .... } Iron Work, 2 cwt.................................... }	2¾		
Steel Springs taken off..........................		11	8¼
Carriage-Bearing, Drawing, & Buffing Springs...	4½		
Steel Springs taken off..........................		9¾	5¼
Waggon-Bearing, Drawing, & Buffing Springs...	3½		
Steel Springs taken off..........................		8¾	5¼

2ndly.—Steadiness of motion. This has been referred to before; and it may be added that the great steadiness of the engines with the India-rubber springs is the surprise of every one who has witnessed their performance upon the imperfect road on which they are worked.

3rdly.—Durability. Although sufficient time may not have elapsed to test the absolute durability of these springs, yet during the time they have been in use, in consequence of the heaviness of the work, if deterioration had commenced ever so slightly, it would have been observable; but in a large number of the India-rubber cylinders that were examined, after being at work for various periods, varying from four to six months, in both engines, carriages, and waggons, in no instance was the slightest alteration visible from the day in which they were first used, nor the slightest permanent contraction in length or expansion in diameter perceptible: it may, therefore, be inferred, that their durability far exceeds anything hitherto applied to the same purpose, and is fully equal to any reasonable expectation or requirement. The specimens shewn to the meeting, having been in use for the last five or six months, corroborated this statement. The weight on each pair of the engine springs is from 4¾ to 9¼ tons.

4thly.—Saving in repairs. The simple construction of these springs renders it almost impossible for any injury to happen to them; consequently little or no repairs are needed. As stated before, the cost of repairing the steel springs of fifteen engines, for six months, was £251. 9*s*. 9*d*. The cost of repairing the India-rubber springs of fourteen engines, during the last six months, was only £1. 18*s*. The saving in the cost of repairs is

not confined to the springs alone, but the engine itself: the carriages and waggons to which they are applied, and even the permanent way, share the advantage. It is found that fewer chairs are broken, fewer rails (plates rather) are bent, less grease and oil is used for the bearings, and the cost of maintaining the waggons is reduced when India-rubber is used. It is inferred, with a considerable degree of probability, that, from the absence of any jerk upon the axles, the tendency of the iron to become crystallized or altered in its nature, and suddenly fracturing, so often complained of, and which has produced so many serious accidents upon railways, will, by the use of these springs, be nearly overcome, and the axles remain perfect for a much longer period; more especially as under the India-rubber springs they shew no tendency to heat.

5thly.—Cost. The question of first cost does not properly belong to this paper, but it will be sufficient to state that a well-constructed India-rubber spring ought not, in any case, to exceed the cost of a steel spring of equal strength; but on the hydro-pneumatic principle it will be found to be considerably cheaper, especially for engines,—amounting, on an average, to 20 per cent. saving on the old plan.

The foregoing remarks have been made chiefly with reference to bearing springs; but they apply equally to both buffer and draw springs; and in proportion to the extent in which India-rubber is used in place of steel, does the improvement in the rolling stock become apparent, and the benefit resulting from its use more strongly develope itself. The pneumatic buffers, it is considered, have been subjected to a peculiarly severe test,—few lines of railway in the kingdom possessing such disadvantageous circumstances. Almost every other description of buffer had been tried previously with the same want of success, until, from repeated failures, the attempt to obtain a permanent buffer was almost abandoned in despair, and solid blocks of wood were substituted for them in many instances. With these buffers, however, no failure has taken place, nor in any instance has their elasticity diminished in the slightest degree. In the accompanying table, the deflection of this description of buffer and the several kinds of springs, under different weights, is shewn.

Table of Deflection of Springs.

Load.	Engine Single Spring.	Engine Triple Spring.	Engine Hydro-Pneumatic	Waggon Spring.	Buffer Spring.	Draw Spring.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
$\frac{1}{2}$ ton.	[illegible]	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{3}{16}$	1
1st ton.	[illegible]	$\frac{1}{2}$	$\frac{7}{8}$	$1\frac{1}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$
2nd „	[illegible]	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{8}$	1
3rd „	[illegible]	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{16}$	$\frac{5}{8}$
4th „	[illegible]	$\frac{1}{4}$	$\frac{1}{16}$	—	$\frac{1}{8}$	—
5th „	[illegible]	$\frac{1}{4}$	$\frac{1}{16}$	—	$\frac{3}{16}$	—
6th „	[illegible]	—	—	—	$\frac{3}{16}$	—

Before the application of India-rubber draw-springs to the engines and tenders, the couplings were frequently breaking, and also the frame ends: but since their adoption nothing of the kind takes place. Such are the advantages of these springs that their adoption promises to become general, and it will be shortly, without doubt, as rare to meet with a waggon unprovided with a draw-spring, as it was formerly to meet with one.

In working 15,000 miles, the cost of repairs is found to be reduced in the engines using India-rubber springs, in corresponding engines of the two classes, from $5\frac{3}{4}d.$ to $3\frac{3}{4}d.$ per mile, and from $7d.$ to $3\frac{1}{4}d.$ per mile.

It has been the writer's object in this paper to state rather what has been done than to speculate on what will be; but it is notorious that the ordinary steel springs are deficient in point of general efficiency, whether as regards elasticity, durability, or cheapness. It may be that competition may cause their manufacture to be less strictly attended to than formerly; or it may be, and most likely is, that the requirements of the present day have outstripped their ability to perform. However, be that as it may, it is well known that a substitute which shall combine the above requisites has been long desired; and the writer's hope, therefore, that this desideratum will now be supplied by the springs which have been described, must be his apology for bringing the subject before the Institution.

Mr. Craig exhibited a set of the different descriptions of India-rubber springs described in the paper, and also specimens of the India-rubber cylinders, taken out of various springs which had been at work on the Monmouthshire Railway, to shew the effects of wear upon them. One cylinder had worked 8,850 miles in the bearing spring of an engine; another 14,060 miles in a carriage bearing spring; and an engine buffer spring that had been six months in constant use was shewn: all of these appeared uninjured by the work, and not to have suffered any permanent compression.

Mr. H. Wright observed that he had seen these India-rubber springs at work on the Monmouthshire Railway, and they certainly worked very satisfactorily, and were much better adapted to that situation than steel springs. The case of that railway was very peculiar; it was perhaps the worst in the kingdom for destructive action on the springs, from the great inequality and roughness of the road, which was not upon the edge-rail, but the old tramway system, and with very sharp curves; it was, indeed, impossible for steel to stand in the engine springs; but the India-rubber springs appeared to stand the work well.

Mr. W. A. Adams said he was acquainted with these India-rubber springs, and had witnessed their working on the Monmouthshire line; it was previously impossible to keep steel springs in order, from the violent jerks they were subjected to,

and the substitution of India-rubber for steel in that case was an important improvement. As to the general application of India-rubber springs, there was a special circumstance in favor of their use in locomotive engines, from the confined position and the want of space to fix a properly proportioned laminated steel spring, which might probably be otherwise made to work satisfactorily; but the steel springs generally used in locomotives were so short and stiff, that their elastic action was exceedingly imperfect, and they were consequently ill suited to withstand the violent concussions of a rough road. In the bearing springs of carriages the case was very different; and a long, thin laminated spring was employed, which had a very easy, elastic action; so that in that case the advantage would be less felt of the substitution of India-rubber for steel. In applying the India-rubber springs to carriages, it had to be observed that the bearing of the frame would be on four points only, instead of eight,—requiring a stronger frame or cross-bars to distribute the strain.

Mr. Allan said he had made some trial of these India-rubber bearing springs on engines, and they worked very well—but he found them too elastic, and liable to produce a jumping action; but the springs he had tried were of the kind first described, without provision for checking the rebound of the spring.

The Chairman inquired whether, if such re-action could be removed, the India-rubber spring would be considered superior to steel?

Mr. Allan thought that very little friction or resistance would be sufficient to check the re-action; and the India-rubber would then certainly make a very good spring.

Mr. Craig observed, that the rebound complained of was quite stopped by the little resistance offered by the small second spring that had been subsequently introduced; but it was now found that the objection was quite removed by the water application in the new compound spring.

Mr. Clift inquired whether any difference was found between winter and summer in the action of the India-rubber? whether there was any more oscillation observed in hot than in cold weather? and whether the India-rubber was liable to any injury by the heat to which it was liable to be exposed from the boiler or fire-box of the engine?

Mr. Craig replied, that the India-rubber was not affected by the temperature, and no effect was found during the last severe winter; also, in two tank engines, one pair of the India-rubber springs was exposed to great heat, probably as much as 240°, being very near the fire-box, but there was no perceptible effect. The material used for the springs was Moulton's prepared India-rubber: the raw gum would not stand exposure to heat, and the constant compression and elastic action.

The Chairman inquired what pressure there was upon the India-rubber when the springs were at work?

Mr. Craig replied, that the vertical pressure on the end of the India-rubber cylinder, in the engine bearing springs, amounted to about $1\frac{1}{2}$ cwt. per square inch; a weight of $4\frac{1}{2}$ tons being supported on a cylinder 9 inches diameter, having a $1\frac{3}{4}$-inch hole in the centre. In the hydro-pneumatic spring the pressure on the India-rubber was about 2 cwt. per square inch: he intended trying the exact pressure of the water with a Bourdon's pressure gauge, but had not been able to complete the experiments in time for the present meeting.

Mr. E. A. Cowper observed, that he understood a considerable trial of India-rubber springs had been made on engines upon the London and North-Western Railway, and inquired what kind of spring had been applied there, and what were the results? He had also heard that on the Great Western they used India-rubber springs, and now never hung an engine any other way.

Mr. Craig replied, that the springs tried on the London and North-Western were with two or three cylinders of India-rubber, similar to the first arrangement described, and they were working very satisfactorily, and, he believed, were preferred to steel springs.

The Chairman inquired the relative cost of India-rubber and steel springs?

Mr. Craig said, that the cost of the India-rubber springs did not in any case exceed that of steel. Waggon springs were about £3. 18*s*. per set; but engine springs were considerably less expensive than steel, there being so much greater proportionate weight of steel in the ordinary springs. By the introduction of water in the improved springs, the quantity of India-rubber to support the same weight was reduced from 20 lbs. to 12 lbs. in each spring, which, at the cost of two shillings per pound, effected a considerable saving in the expense. A considerable saving in respect of grease had also been observed, but not being able to give the exact results, he would make a comparative trial for the purpose of determining that point.

The following paper "*On railway axle lubrication,*" by Mr. W. Bridges Adams, of London, was next read:—

In the economy of railway transit an idea has prevailed that increase of speed increases cost in a compound proportion, in many other things than the mere excess of fuel consumed in the locomotive. This is correct only in reference to imperfect appliances. If, for example, the rails deflect beneath the rolling loads, the substructure will be displaced, and increased speed will greatly increase the displacement. If the wheel peripheries be out of order, the greater the speed the greater will be the destruction; and so also if the rail surfaces or joints be out of order. And in proportion as the springs are inefficient, *i. e.*, are non-elastic, or do not act through sufficient space to moderate the shocks, so will the destructive wear be increased by increased speed. But were

all parts of the system—ballast, sleepers, rails, wheels, axles, journals, bearings, lubrication, and springs—rendered as perfect as is within the scope of mechanical art, there seems to be no reason why increased speed should involve any extra cost beyond the increased consumption of fuel, oil, and grease, provided all parts of the system be proportioned to each other.

In increasing speed with imperfect mechanical arrangements, one of the most prominent difficulties occurs in preventing axles and axle-boxes from heating: the cause of the heating is in the imperfect lubrication. The word lubrication literally signifies slipperiness, but this does not express the precise action. Oil or grease, or soap interposed between two metallic bodies moving one upon the other, is composed of a series of small globules, which keep the bodies separated, and serve as rollers. The surfaces of metallic bodies, however apparently smooth, are composed of saliant and re-entrant angles of larger or smaller size, according as the metal is hard and polished, or soft and rough. Therefore the more imperfect the structure of an axle and bearing, the more viscid must be the lubricating material to keep them from contact. If the cushion of lubricating material be insufficient in extent, contact ensues between the salient angles of the metal, and heating takes place to such an extent as to boil away the lubricating material and drive it off.

In calculating the surface bearing of axles, there are two circumstances to consider:—First, the actual weight to be borne; and, secondly, the amount of concussion adding to the effect of the weight, which latter will much depend on the efficiency of the springs to moderate the effect of the shock.

Before the advent of railways, mail-coaches and private carriages, with a maximum weight of 3 tons, were constructed with axles, case-hardened, and with a bearing surface on each arm equivalent to 30 square inches. This is equivalent to about 56 lbs. per square inch on the bearing.

Mr. Nicholas Wood, in his experiments on axle friction, found that with the best oil, and with favorable circumstances, a superincumbent weight of 90 lbs. per square inch gave the minimum of friction.

Some of the earliest railway axle-bearings were 4 in. in length by 2½ in. diameter; something under 14 inches of total bearing surface, fitted, according to Mr. Wood's calculations, only for a waggon of 2 tons total weight. It would seem as though these sizes had been calculated from the fixed shafting of factories, without any calculation of concussion. Probably this was the reason why viscid soap was substituted for fluid oil; increasing the toughness of the material used for lubrication to make up for the want of bearing surface. In railway practice, it is found that the soap or grease which serves well in the winter, is too fluid in the summer; a sure proof that the bearing surface is far too small for any lubrication with oil, which offers the minimum amount of friction.

A strong objection to soap lubrication is, that it requires a considerable amount of friction in the winter time to make it fluid; and it is sometimes difficult to start a train into motion when the grease has been frozen.

In the wheels of highway carriages, the oil chambers are contained within the wheels, and revolve with them; which process involves the efficient lubrication of the axle. In the axle-boxes of railway carriages the grease or oil does not revolve. In the highway wheels the oil always has a tendency to rest in the well or magazine below the level of the axle. In the ordinary axle-boxes of railway carriages the grease or oil is above the level of the axle; and as the axle revolves, the oil or grease, or rather the grease (oil not being used, except in engines) passes through a hole or holes in the bearing brass, which lies on the upper half of the axle; and thus the process is like that of a hand-mill: the lubricating material is supplied on the upper surface of the axle, and passes away at the lower like grist. To make the lubrication more certain, the holes are of large size; and this involves an evil by diminishing the bearing surface at the most important point. If these holes get stopped, the lubrication ceases, and heating ensues; and there are no means to remedy the evil, save by lifting the bearing from the axle and inserting more grease.

Thus, in the ordinary railway grease-box, there is not only a great waste of grease, but also a very imperfect mode of securing lubrication. The well-made case-hardened axles of a common road carriage are capable of running 5000 miles over a bad road, with once oiling, with a small quantity of oil; while railway axles require greasing every 100 miles or less, with some few exceptions.

Impressed with these imperfections, the writer, some years back, began to consider the best means of remedying them. It was evident that the only mode of applying grease or oil to a large surface of the axle-bearing, was at the under side. In the common mode of an open bottom this was scarcely practicable; and the question was, could the bottom be effectually closed without so confining the axle as to make partial heating dangerous. This was accomplished by applying a flexible connection between the axle and the inner side of the axle-box, and making the bottom of the box tight. In this mode, the grease filling the lower part of the box, the whole under surface of the axle was bathed in it, while all dirt and grit were excluded. Moreover, the grease being as it were in a well below the axle, any accidental extraneous matters could sink to the bottom, and not be brought in contact with the wearing surface. And supposing the upper holes to be entirely stopped, lubrication would go on notwithstanding. It must be evident, that feeding from above, in all cases, involves the chance of dirt getting to the axle, which feeding from below obviates.

To provide against accidental injury to the axle-bearings, the writer provided also for a mode of shrinking on a false bearing

upon the axle-arm, so that in case of cutting, it might be removed and replaced.

The following is a description of one of the axle-boxes, invented and patented by the writer, in May, 1837, employed on the North Kent line:—The top of the box is circular, for a peculiar arrangement of springs; the box is cast open-fronted with a moveable front to attach by screws; a grease-tight joint being maintained by an elastic substance between. In this mode the interior of the box can be inspected, and a new brass applied, without lifting the carriage. The back of the box round the axle is cast with a round-edged projecting lip. A plate of metal, with a centre hole fitting the axle, is secured by bolts to the back of the box, with a piece of leather, the orifice of which is enlarged into a partial pipe-form round the axle, to give increased bearing surface. This leather presses equally on the axle and on the lip of the box, and thus a tight joint is maintained, which preserves the grease without overflowing above the level of the bottom of the axle. The bolt-holes in the metal plate are oblong vertically; so that when the upper bearing brass wears, and causes a corresponding wear in the plate and leather, and a consequent leak below, the two latter may be drawn upward to fit the lower part of the axle. At the top of the box there is a screw tap for feeding, with holes through it, to admit of the ingress and egress of air. This tap serves to feed an upper chamber, having holes leading to the axle as usual, and also to feed the lower chamber, which, in addition, catches the grease that falls through from the upper chamber by the working of the axle. A piece of hard wood is applied between the end of the axle and the front of the box, to prevent the wear of the shoulder collar of the bearing brass. Two rollers of light wood float on the oil or grease in contact with the lower side of the axle, and thus carry up the lubricating material if it happens to be below the level of the axle.

The author next described an axle and axle-box, also for an upper and lower feed. To retain the grease or oil, a conical metal spring is inserted in a corresponding circular groove at the back of the box; and by pressing against a strip of leather lining the groove, it forms a tight joint. The small end of the conical spring clips a leather pipe-collar, fitted on the axle, which collar may either revolve with the axle in the small end of the spring, or may be fixed to the spring, and the axle revolve within the leather collar. As the spring expands against the groove in the box, it has no tendency to press the axle or leather too tightly, so as to cause friction. The conical spring is prevented from turning by a stud: the edges of the spring overlap each other, to keep out dirt; and the hollow space between the spring and the axle may be filled with sponge or cotton waste.

An axle-box on a similar arrangement, in which is a conical pipe of blocked leather, is secured to the box lip by an elastic ring, similar to a key-ring, and clipped to the axle by a second ring.

Both the spring cone and the leather cone will, by their free action, accommodate any irregular movement of the box, and prevent loose wear between both them, the metal plate, and leather. In all cases where any material comes in contact with the revolving axle, it is essential that the surface be properly smoothed, that the pressure be as light as may be convenient, and the lubrication certain.

In addition to the axle-box arrangement, a mode was described of applying moveable journals to axle-arms, either new or old. The journal is forged down to a taper, with the object of extending the distance of the bearing from the wheel, or of increasing the diameter of the axle-bearing; and the moveable bearing being of wrought-iron, or cast-iron well got up and case-hardened, manufacturers may supply a superior class of axle-box and bearing cheaply. Railway companies might thus be enabled, at comparatively little cost, to replace their axles when rendered unsafe by long vibration in running.

Great numbers of these boxes, with leather collars, were said to have been applied, and with good results.

The mode of lubrication from above the bearing had an objection, in the liability to accident by dirt getting on the arm, and from the holes wasting a most important part of the bearing surface; but the writer thought it preferable to retain it; keeping the holes small, but merely as a security in case of any accident happening to the lower reservoir.

Two forms of journal were shewn to the meeting,—one the double cone,—the other the ordinary cylindrical journal with collars. There is an advantage in the double cone with the small diameter in the centre of the bearing, in that it has a tendency to cause the lubricating fluid to pass outwards from the centre while in rapid motion. The cylindrical bearing between collars has this disadvantage, that the box is not kept in its position by gravity, but by a very small collar surface, which being vertical does not retain the lubricating fluid so easily as the horizontal surface; and, moreover, by its larger diameter has a tendency to throw it off by centrifugal action. The cylindrical bearing has, however, the advantage, that the bearing surface is not lessened by end play; and with the axle working in a bath of lubricating material, the collars will at all times be safe enough. In either case, of the cone or the cylinder, it is clear that the lubricating bath below will be the safest precaution against heating. As regards the strength of the axle, the coned journal has the advantage, by its gradual tapering form,—supposing an equal amount of metal in both cases.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Cases in which a full Specification has been deposited.*]

1287. William Haslett Mitchel, of Brooklyn, New York, United States of America, for improvements in means for distributing and composing types.—[*Dated May 25th.*]

1347. Admiral the Earl of Dundonald, of Belgrave-road, for improvements in apparatus for laying pipes in the earth, and in the juncture of such pipes.—[*Dated June 1st.*]

1376. John James Kerr, of Gloucester-grove West, Old Brompton, for improvements in the manufacture of cartridges.—[*Dated June 4th.*]

1400. Thomas Davis, of West Bromwich, Boaz Bloomer, of Dudley, and Boaz Bloomer, jun., of Pelsall, for improvements in the manufacture and piling of iron to be used in the production of railway chairs.—[*Dated June 7th.*]

1408. Antoine Ponçon, of Marseilles, for certain improvements in obtaining motive power.—[*Dated 9th June.*]

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905. Thomas Haigh, of Skircoat, Yorkshire, for an invention for the cleansing of pans and other culinary utensils.—[*Dated April 14th.*]

940. William Hale, of Swan-walk, Chelsea, for new kinds of fire-arms.—[*Dated April 19th.*]

943. Frederick Henry Smith, of Southwark, for improvements in apparatus for cleansing the interior of tubular boilers and other hollow articles.—[*Dated April 19th.*]

959. Thomas Dunn, of Windsor Bridge Iron Works, Pendleton, near Manchester, for certain improvements in and applicable to boilers or apparatus for generating steam, and in apparatus connected therewith.—[*Dated April 21st.*]

981. Henry Houldsworth, of Manchester, for improvements in machinery used for combing cotton, silk, silk waste, flax, tow, wool, and other fibrous substances.—[*Dated April 23rd.*]

1011. James Dinning, of Southampton, for certain improvements in wash-stands and baths; part of which improvements are also applicable to table fountains.—[*Dated April 27th.*]

1029. John Hetherington, of Manchester, for certain improvements in machinery for combing cotton, wool, silk waste, flax, tow, and other fibrous substances.—[*Dated April 28th.*]

1056. James Greenwood, of New Accrington, for an improvement in fixing mordants on fabrics.—[*Dated May 2nd.*]

1086. Cornelius Alfred Jaquin, of Monkwell-street, London, for improvements in the manufacture of covered buttons made by dies and pressure.—[*Dated May 4th.*]

1113. Thomas Murray, of Marygold, Berwick, Scotland, for a

new machine or implement for hoeing, cutting, and otherwise operating upon turnips or other agricultural produce.

1121. Christopher Nickels, of York-road, Lambeth, for improvements in machinery for masticating, kneading, or grinding India-rubber, gutta-percha, and other matters.

1122. William Longmaid and John Longmaid, of Beaumont-square, for improvements in treating waste products obtained in smelting and otherwise treating ores and minerals, and in producing a valuable product or products therefrom.

The above bear date May 6th.

1134. Edward Blackett Beaumont, of Wood Hall, Barnsley, Yorkshire, for certain improvements in the mode of constructing dwelling-houses or other buildings, and in peculiar shaped bricks and tiles to be used for the purpose.—[*Dated May 9th.*]

1155. Jacob Brett, of Hanover-square, for improvements in electric telegraph apparatus;—being partly a communication.

1157. Samuel Cunliffe Lister, of Manningham, Yorkshire, for improvements in treating and preparing, before being spun, wool, cotton, and other fibrous materials.

1159. Henry Potter Burt, of Charlotte-row, London, for improvements in portable houses.

1161. John Mottram, of Liverpool, for improvements in machinery for washing ores, and separating metals from earth or other compounds.

1163. John Bottomley, of Bradford, Yorkshire, for improvements in the manufacture of textile fabrics.

1165. Alfred Bird, of Worcester-street, Birmingham, for improvements in the means of communicating between guards or persons and the engine-driver of a railway train.

1167. Edmund Whitaker, of Rochdale, and James Walmsley the younger, of Smithy Bridge, near Rochdale, for improvements in the manufacture of pipes, tiles, bricks, and slabs, from clay.

1169. George Bell, of Powell-street, Goswell-street, for improvements in obtaining liquid cement and pigments or paints.

1170. Abraham Matthews, of Denby-street, Pimlico, for improvements in disengaging boats from ships or other vessels.

1171. William Bull, of Battersea, for improvements in direct acting steam-engines with fixed cylinders.

The above bear date May 11th.

1173. James Parkes, of Birmingham, for a new or improved stop-cock for regulating the flow of gases.

1175. Joseph Denton, of Prestwich, for improvements in machinery or apparatus for manufacturing looped terry or other similar fabrics.

1177. Julian Bernard, of Guildford-street, Russell-square, and Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, for improvements in pressing and in extracting fluids.

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1178. Charles Pooley, of Manchester, for an improved mode of feeding machines for opening, cleaning, blowing, and scutching cotton and other fibrous substances.

1179. Joseph Stayner Eidmans, of Lacey-terrace, Kennington-road, for certain improvements in umbrellas and parasols.

1180. John Arrowsmith, of Bilston, for a new or improved turn-table.

1181. George Bertram, of Edinburgh, for improvements in the manufacture of paper.

1182. George Stiff, of Minerva Cottage, Brixton-hill, for an improved construction of printing machine.

1183. William Thomas, of Cheapside, for improvements in weaving narrow fabrics for binding.

1184. Charles Tetley, of Skinner-street, for improvements in rotary engines.

1185. Robert Smith Bartleet, of Redditch, for improvements in sewing machines.

1186. Richard Archibald Brooman, of London, for improvements in the manufacture of hats,—being a communication.

1187. Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, for improvements in steam-boilers.

1188. John Knowles, of Manchester, and Edward Taylor Bellhouse, of the same place, for certain improvements in the manufacture of articles of marble.

The above bear date May 13*th.*

1189. Richard Eades, of Birmingham, for a new or improved metallic wheel.

1190. George Fitz James Russell, of Duke-street, Adelphi, for an apparatus for disengaging, lowering, and raising ships' boats.

1191. George Coppock, of Heaton Norris, for certain improvements in looms for weaving.

1192. John Browne, of Upper Charlotte-street, for improvements in the construction of chimnies or flues, and in apparatus for increasing draft, consuming smoke, or utilizing the same.

1193. James Higgin, of Manchester, for improvements in printing or dyeing woven or textile fabrics, and in the manufacturing of certain substances to be used in the arts or processes of dyeing and printing.

1194. Thomas Stephen Holt, of Manchester, for improvements in steam-engines, which improvements are also applicable to the machinery or apparatus connected to steam-boilers.

1195. Moses Poole, of Avenue-road, Regent's-park, for a new or improved machine for pegging boots or shoes,—being a communication.

1196. Herman Dirs Mertens, of Margate, for improvements in preparing materials to be employed in making beer and other beverages,—being a communication.

1197. William John Warner, of King-street, Soho, for improvements in dry gas-meters.
1198. Francis Montgomery Jennings, of Cork, for improvements in treating wool, silk, feathers, and other animal matters, for softening and otherwise improving the quality of the same.
1199. John O'Keefe, of Queen Ann-street, Liverpool, for improvements in the manufacture of watch-cases.
1200. Stephen Garrett, of Taunton-place, Bermondsey, for improvements in the preparing and tanning of skins, hides, or pelts of animals.
1201. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in steam-engines,—being a communication.
1202. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in steam-boilers,—being a communication.
1203. John Drumgoole Brady, of Cambridge-terrace, for improvements in knapsacks.
1204. Robert Walter Swinburne, of South Shields, for improvements in apparatus or machinery to be used in the manufacture of glass.
1205. Eugène Rolt, of St. John's Wood, for certain improvements in piano-fortes.

The above bear date May 14*th.*

1206. Jean Jacques Joseph Jamin, of Gerrard-street, and Alexander Symons, of the Strand, for certain improvements in the manufacture of boots and shoes.
1207. Jean Emile Barse, of Paris, for improvements in the manufacture of grease or composition for lubricating the axles and moving parts of machinery.
1208. Thomas Richardson, of Newcastle-upon-Tyne, for improvements in the manufacture of certain compounds containing phosphoric acid.
1209. Robert Boyd, of Paisley, for improvements in weaving.
1210. William Littell Tizard, of Aldgate High-street, for improvements in dredging-machines.
1211. Moreton Hassall Phillips, of Shrewsbury, for an improved gun.
1212. George Jones, of Birmingham, for improvements in ventilating mines.

The above bear date May 16*th.*

1214. Charles James Pownall, of Addison-road, for improvements in the preparation and treatment of flax and other similar vegetable fibres.
1215. John Lee Stevens, of King William-street, City, for imments in grates and stoves.
1216. Joseph Webb, of Mayfield-terrace, Dalston, for improvements in rotary engines.

1217. James Thomas George Vizetelly, of Peterborough-court, and Henry Richard Vizetelly, of Gough-square, for improvements in printing machines,—being a communication.

1218. Samuel Eccles and James Eccles, of Kensington, Philadelphia, for certain improvements in power-looms for weaving figured fabrics.

The above bear date May 17th.

1220. Charles Cowper, of Southampton-buildings, for improvements in machinery for combing and preparing wool and other fibrous substances,—being a communication.

1221. Christopher Richard Norris Palmer, of Amwell, for an improved mode and apparatus for working the machinery in factories and ships, in connection with the steam-engines or steam power now used therein.

1222. John Haskett, of Wigmore-street, for improvements in anchors, to be called the "Ferdinand Martin safety-anchor,"—being a communication.

1223. Bernard Peard Walker, of Wolverhampton, and James Warren, of Mile-End-road, for improvements in the manufacture of iron.

1224. Wharton Rye, of Collyhurst, near Manchester, for certain improvements in kitchen ranges or fire-grates.

1225. Charles Clarkson, of Avery-row, Lower Grosvenor-street, for an improved duster or dusting-brush, painting-brush, and all other description of brushes, the handle of which passes through the centre, and the hair or bristles are bound or tied round it.

1226. Richard Thompson, of Finsbury-chambers, Blomfield-street, for making perforated building-stone.

1227. John Ryan, of Liverpool-street, London, for an apparatus for purifying liquids in a ready and economical manner.

1228. John Barsham, of Kingston-upon-Thames, for improvements in drying bricks, peat, and other articles.

1229. John Barsham, of Kingston-upon-Thames, for improvements in charring peat and other vegetable substances, and in burning lime.

1230. Edward Thornhill Simpson, of Wakefield, for improvements in the manufacture of manure.

1231. George Sant, of Norton Lodge, Mumbles, Swansea, for improvements in clocks or time-keepers.

1232. William Gossage, of Widnes, for improvements in the manufacture of alkali from common salt.

1233. John Oakey, of Blackfriars-road, for improvements in reducing emery, glass, and other like substances.

1234. Benjamin Newton, of Brighton, for improvements in the manufacture of mats.

1235. Job Allen, of Bower-street, for improvements in communicating intelligence.

1236. Edward Briggs, of the Castleton Mills, near Rochdale, for improvements in the manufacture of pile fabrics, and in the machinery or apparatus employed therein.

The above bear date May 18th.

1237. Samuel Wright, of Church-street, Shoreditch, for making a gas, steam, air, or liquid safety-tap.

1238. Thomas Grahame, of Hatton Hall, Wellingborough, for improvements in the manufacture of covering materials for houses and other structures and surfaces.

1239. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery or apparatus applicable for pumping water and supplying steam-boilers with water, and maintaining the water therein at a proper level,—being a communication.

1240. John Hippisley, of Stoneaston, for improvements in steam-engines, suitable for agricultural purposes, and to locomotion on common roads.

1241. John Ames Gilbert, of Clerkenwell, for an improvement in canisters.

1242. Joseph Wainwright, of Heap, near Bury, for certain improvements in apparatus for regulating or governing the speed of steam-engines.

1243. John Thornborrow Manifold, Charles Spencer Lowndes, and John Jordan, all of Liverpool, for improvements in the method of extracting the juice from the sugar-cane.

1244. William Fulton, of Paisley, for improvements in the treatment and scouring or cleansing of textile fabrics.

1245. Charles De Bergue, of Dowgate Hill, for improvements in the permanent way of railways, and also in chairs, and in sleepers for permanent way.

The above bear date May 19th.

1246. St. Thomas Baker, of King's-road, Chelsea, for improvements in revolving shutters.

1247. Charles Cowper, of Kensington, for improvements in steam-boilers.

1248. Edward Jones Schollick, of Aldingham Hall, Ulverstone, for improvements in obtaining motive power.

1249. Samuel Schollick, of Ulverstone, for improvements in ship-building.

1250. Henry Gilbert, of Kensington, for improvements in apparatus for cleaning boots and shoes.

1251. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in rotary engines to be driven by steam or any vapour, fluid, or gas, and in boilers or generators to be used in generating steam or gas for driving the aforesaid or other engines, or for other purposes,—being a communication.

1252. Thomas Isaac Dimsdale, of Kingstown, near Dublin, for

improvements in purifying coal gas and in disinfecting sewage or other fetid matters, and in absorbing noxious gaseous exhalations.

1253. Edward Hammond Bentall, of Heybridge, for improved machinery or apparatus for measuring and indicating the power exerted by engines, and also the force required to propel machinery, carriages, or ploughs.

1254. William Carr Thornton, of Cleckheaton, for improved machinery for making wire cards.

The above bear date May 20th.

1255. George Carter, of Mottingham, for improvements in the manufacture of fire-lighters, and in machinery connected therewith.

1256. John Blair, of Ducie Bridge Mill, Manchester, for the application of steam power to the working of railway breaks.

1257. Joseph Betteley, of Liverpool, for improvements in anchors.

1259. Louis Gervais Dieudonné Buffet Delmas Ducayla, of Bordeaux, for an improved manufacture of artificial fuel,—being a communication.

1261. George Marriott, of Hull, for improvements in the manufacture of fire-lighters.

1262. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in navigable vessels to be employed in all waters, and to be propelled or impelled by sails, steam power, or other means,—being a communication.

The above bear date May 21st.

1263. Samuel Alfred Carpenter, of Birmingham, for a new or improved elastic webbing or fabric.

1264. Evan Evans, of Birmingham, for an improvement or improvements in castors for furniture.

1265. Adolphe Augustin Girouard, of Paris, for certain improvements in paving and generally in covering surfaces with asphaltic and other similar materials.

1266. William Simson, of Edinburgh, for improvements in locks.

1267. Auguste Edouard Loradoux Bellford, of Castle-street, for an improved method of treating flax and hemp, whereby they are brought to such a state that they may be carded, spun, and woven by machinery, such as is now employed in the manufacture of cotton and wool into yarn and cloth,—being a communication.

1268. Amédée Devy, of Grosvenor-street, for improvements in storing and preserving grain,—being a communication.

1269. John Harcourt Browne, of Arthur's Seat, Aberdeen, for improvements in apparatus for bottling or supplying vessels with fluids.

1270. Paul Hannuic and Gustave Collasson, of Paris, for improvements in the treatment of oil.

1271. Henry Turner, of Wilson-street, Limehouse, for a new mode of applying hydraulic power to windlasses, for weighing anchors and lifting heavy weights.

1272. John Henry Johnson, of Lincoln's-inn-fields, for an improved forge hammer,—being a communication.

1273. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the construction of pipe and other junctions,—being a communication.

1274. William James Sluce, of Bethnal-Green-road, George Benjamin Mather, of Derby, and Phillip Wood, of Stratford, for a new apparatus for raising and forcing water or other fluids.

The above bear date May 23rd.

1275. William Babb, of Gray's-inn-road, for improvements in the manufacture of hair trimmings.

1276. William Babb, of Gray's-inn-road, for improvements in the manufacture of hats, caps, and bonnets.

1277. William Church, of Birmingham, for a new or improved sight for cannons or other ordnance.

1278. George Irlam Higginson, of Meeting-house-lane, Dublin, for improvements in machinery or apparatus for evaporating or concentrating liquids.

1279. Frederick Russell, of Regent's-park, for improvements in raising and lowering windows, shutters, blinds, and similar appendages.

1280. James Lovell, of Glasgow, for improvements in heating and ventilating.

1282. Louis Auguste Deverte, and Charles Eck, of Argenteuil, near Paris, for an improved machinery for combing wool.

1283. Samuel Sanderson Hall, of the Minories, for improvements in the means of preventing railway carriages running off the rails,—being a communication.

1284. Pierre Trossaert Bundervoet, of Ghent, for improvements in shutters,—being a communication.

1285. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improvements in the generation of steam,—being a communication.

1286. Jonathan Dodgson Carr and John Carr, of Carlisle, for an improved construction of oven.

The above bear date May 25th.

1288. Alexander Porecky, of Bishopsgate-street Within, for improvements in the manufacture of umbrellas and parasols.

1289. Thomas Singleton, of Over Darwen, for improvements in looms.

1291. George Simpson, of Manchester, for improvements in weighing-machines.

1292. William Racster, of Woolwich, for central action buffers and spring guides for traversing rods.

1293. Charles Cowper, of Southampton-buildings, for improvements in the manufacture of iron,—being a communication.

1294. William Warcup, of Bristol, for improvements in the construction of springs for carriages, and similar purposes.

1295. Alphonse Rene le Mire de Normandy, of Judd-street, for improvements in regulating the pressure of steam.

1296. Jonathan Saunders, of St. John's Wood, for improvements in the manufacture of railway and other wheel tyres.

1297. Theophilus Westhorp, of Poplar, for improvements in the manufacture of oakum.

1298. William James Harvey, of Exeter, for improvements in fire-arms.

1299. John Box, of Brussels, for improvements in supplying water to steam-engine boilers,—being partly a communication.

1300. William Weatherley and William Jordan, of Chartham, for improvements in the stuffing-boxes of piston-rods.

1302. Julius Augustus Roth, of Philadelphia, for improvements in the mode of, and machinery for, treating the fibres of flax, hemp, China grass, and other analogous substances, preparatory to spinning,—being partly a communication.

The above bear date May 26th.

1303. William Henham, of East Peckham, for certain improvements in ploughs.

1304. Samuel Smith Shipley, of Tower-street, for improvements in cases or receptacles for containing a composition shaving-soap, or other articles.

1305. Claude Arnoux, of Paris, for certain improvements in the construction of locomotives.

1306. Aristide Michel Servan, of Philpot-lane, London, for improvements in treating fatty matters to render them suitable for the manufacture of candles.

1307. John Lee Stevens, of King William-street, for improvements in furnaces.

1308. Alexander Keiller, of Dundee, for an improved machine for the manufacture of confections, including all kinds of comfits known by the trade as pan goods.

1310. William Henry Bentley, of Bedford, for improvements in locks and keys, parts of which are applicable to window-sashes and doors.

The above bear date May 27th.

1311. Illingworth Butterfield, of Bradford, York, for improvements in and applicable to looms for weaving.

1312. William Smith, of Salisbury-street, Adelphi, for certain improvements in the machinery for, and method of, making and laying down submarine and other telegraph cables; which machinery is also applicable and is claimed for the making of ropes and cables generally.

1315. Richard Archibald Brooman, of Fleet-street, for improvements in abdominal supporters,—being a communication.
1316. Caleb Hill, of Cheddar, for improvements in the construction of stays.
1317. François Francillon, of Puteaux, France, for improvements in dyeing and printing silk, wool, and other animal fibres.
1318. Daniel Bateman, of Low Moor, near Bradford, York, for improvements in carding wool and other fibrous substances, and in the manufacture of cards for that purpose.
1319. Christopher Binks, of Albert Villa, North Woolwich, for improvements in manufacturing chlorine, and in obtaining certain salts and other useful products from the residual matters of lush manufacture.
1320. William Walker Marston, of New York, for improvements in breech-loading fire-arms, and in cartridges for use with such arms.
1323. Alfred Whaley Sanderson, of Cable-street, Lancaster, for improvements in preparing effervescing powders.

The above bear date May 28th.

1327. John Macdonald, of Henry-street, Upper Kennington-lane, for improvements in and applicable to lamps, also applicable to apparatus for lighthouse signal purposes; part of the invention applicable for other useful purposes.
1328. Francis William Wymer, of Newcastle-on-Tyne, for improvements in raising and lowering ships' boats, and in the apparatus connected therewith.
1329. Julian Bernard, of Guildford-street, Russell-square, for improvements in obtaining differential mechanical movements.
1331. John Champney Bothams, of Vine Cottage, Camberwell-green, for improvements in condensing steam-engines.
1332. Richard Archibald Brooman, of Fleet-street, for improvements in fire-arms,—a communication.
1333. John George Appold, of Wilson-street, Finsbury-square, for a new construction of screw-propeller.

The above bear date May 30th.

1334. William Brookes, of Chancery-lane, for improvements in stoves and grates or fire-places,—being a communication.
1335. William Frederick Shoebridge, of Thames-cottage, East Greenwich, for improvements in the manufacture of drain-pipes.
1336. George Goodlet, of Leith, for improvements in engines to be worked by steam, air, or air and water combined.
1338. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for an improved construction of hand-stamp,—being a communication.

The above bear date May 31st.

1339. Joseph Morris, of Astwood Bank, near Redditch, for an improvement or improvements in the manufacture of envelopes for needles.

1340. Edward Wilkins, of Queen's road, Walworth, for improvements in pots and vessels for the growth and cultivation of plants.
1341. Alfred Hardwick, of Liverpool, for improvements in propelling vessels.
1342. Thomas Aitken, of Bury, Lancashire, for improvements in furnaces for steam-boilers and other purposes.
1344. Jacques Louis Lemaire Daimé, of Paris, for certain improvements in play arms, such as play cannons, pistols, and guns.
1345. Maxwell Scott, of Birkenhead, for improvements in propelling.
1346. James Stocks, jun., of Ovenden, for improvements in looms for weaving.

The above bear date June 1st.

1348. William Knowles, of Bolton-le-Moors, for improvements in machinery for warping and beaming yarns or threads.
1349. Joseph Whitworth, of Manchester, for improvements in machinery for cutting and harvesting corn, grass, and other crops.
1350. Joseph Whitworth, of Manchester, for improvements in machinery for perforating or punching paper, card, and other materials.
1351. John Robert Johnson, of Stanbrook Cottage, Hammersmith, for improvements in the manufacture of type and articles used in letter-press printing.
1352. William Thorold, of Norwich, for improvements in the construction of portable houses, and in machinery for raising, moving, and lowering the same.
1353. Richard Longden Hattersley, of Keighley, for improvements in machinery for forging iron and other metals.
1354. William Hammond Smith, of Gloucester-row, Walworth, for improvements in the manufacture of parchment.
1355. Antoine Remi Cyr Madoré and Daniel Neuburger, both of Paris, for certain improvements in the manufacture of shirts.
1356. Hesketh Hughes and William Thomas Denham, both of Cottage-place, City-road, for improvements in machinery for weaving.
1357. Robert Smith Bartleet, of Redditch, for improvements in the manufacture of needles.
1358. Nicholas Marshall Cummins, of Cork, and John De Cock Kenifeck, of Belfast, for improved machinery for removing the seed from flax and other plants, and breaking the bolls or pods.
1359. William Boyd, of Belfast, for improved apparatus for manufacturing chlorine or chlorides.
1360. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in the manufacture of soles for boots, shoes, and other coverings for the feet,—being a communication.

The above bear date June 2nd.

1361. William Wahler, of Middleton-street, Clerkenwell, for an invention for lithographic printing,—being a self-acting lithographic printing machine, to be propelled by hand, steam, or other motive power.

1362. Jean Durandeau, jun., of Paris, for certain means of obtaining marks and designs in paper.

1363. Ferdinand Louis Gossart, of Rue Montmartre, Paris, for a system of permanent circulation of caloric, intended to produce and overheat steam, gas, and liquid.

1365. James Spotswood Wilson, of Tavistock-place, Russell-square, for a machine or apparatus for digging or raising earth, and applicable to agricultural or engineering purposes.

1366. Isaiah Kendrick, foreman to Messrs. Horton and Son, of Southwark, for improvements in steam-boilers.

1367. Thomas Barnabas Daft, of Lezange Lodge, Isle of Man, for improvements in inkstands.

1368. Richard Robbins, of Dunchurch, for certain improvements in mills for grinding wheat and other grain.

1369. James Hayes, of Elton, Huntingdon, for improved machinery for raising and stacking straw, hay, corn, and other agricultural produce.

1370. William Edward Maude, of Liverpool, for improvements in carriages,—being a communication.

1371. William Edward Maude, of Liverpool, for improved apparatus for steering ships,—being a communication.

The above bear date June 3rd.

1372. Carl Fedor Lenz, of Berlin, for a mechanism of a new construction, having as its end the prevention of the loss of force caused till now by friction, to diminish the oiling till now necessary, and to prevent the heating of the axle-trees in revolving,—being partly a communication.

1373. William Bradburn, of Shiffnal, for the improved manufacture of greases and oils.

1374. Joseph Gyde, of Tooley-street, for improvements in mills and apparatus for grinding and dressing corn and various substances.

1377. Henry John Betjemann, of New Oxford-street, for improvements in chairs.

1378. Edward Blackett Beaumont, of Wood Hall, Barnsley, Yorkshire, for certain improvements in bricks or tiles.

1379. Joseph Burch, of Crag Hall, near Macclesfield, for certain improvements in fans, blasts, or blowing apparatus.

1380. William Dray, of Swan-lane, London, for an improved method of driving shafting.

1381. Benjamin Biram, of Wentworth, Yorkshire, for improvements in working and ventilating mines.

1382. Thomas Russ Nash, of Leigh-street, for improvements in filters.

1383. Christian Schiele, of Oldham, for improvements in pressure indicators.
1384. John Whitehead, of Preston, Lancashire, for improvements in manufacturing pipes or hollow articles from plastic materials.
1385. Thomas Richbell, of Lambeth, for improvements in the application of slate for building purposes.

The above bear date June 4th.

1386. George Carter, of Mottingham, Kent, and George Marriott, of Hull, for improvements in the manufacture of white-lead.
1387. Joseph Gundry, of Bridport, for a certain improvement in the manufacture of fishing and other nets.
1389. Anthony Bernhard Baron Von Rathen, of Wells-street, for improvements in the mode of, and in engines for, applying motive power.
1391. Christopher Nickels, of Albany-road, Camberwell, and James Hobson, of Leicester, for improvements in weaving.
1393. Henry Wiglesworth, of Newbury, Berkshire, for improvements in connecting together or coupling railway carriages.

The above bear date June 6th.

1395. Henry George Rowe, Albert George Andrew, and William Henry Andrew, all of Sheffield, for improvements in the mode of fastening the handles of table knives and forks.
1396. Frederick Lipscombe, of the Strand, for improvements in the construction of ships and boats.
1397. Edward Lavender, of Deptford, for improvements in the manufacture of fuel, and in machinery connected therewith.
1398. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for a novel construction of apparatus to be used as a chest expander, and as a uterine or abdominal supporter,—being a communication.
1401. Robert Booty Cousens, of Halliford-street, Islington, for improvements in the manufacture of casks or wooden vessels.

The above bear date June 7th.

1402. Frederick Ludewig Hahn Danchell, of Elm Grove Villas, Acton-green, and William Startin, of Heathfield-terrace, Turnham-green, for an improved mode of obtaining auriferous deposits from the beds of rivers and lakes, and from pits containing water.
1403. George Tillett, of Kentish Town, for improvements in portable houses and buildings.
1404. John Horrocks, jun., and James Dunlop Horrocks, of Down-street, Piccadilly, for improvements in the manufacture of detonating or percussion caps,—being a communication.

The above bear date June 8th.

List of Patents

Granted for SCOTLAND, from the 22nd May to the 22nd June, 1853.

To Alexander Mills Dix, of Salford, brewer, for certain improvements in artificial illumination, and in the apparatus connected therewith; which improvements are also applicable to heating and other similar purposes.—Sealed 26th May.

Charles Morey, of Moorgate-street, London, merchant, for improvements in machinery for preparing, dressing, cutting, and shaping stone and other materials made use of for building purposes and architectural decorations,—being a communication.—Sealed 3rd June.

Peter Armand Le Comte de Fontainemoreau, of South-street, Finsbury, London, for certain improvements in lithographic, typographic, and other printing presses; which improvements are also applicable, with modifications, to extracting saccharine, oleaginous, and other matters, and in compressing in general, —being a communication.—Sealed 7th June.

Joseph Palin, of Liverpool, wholesale druggist, and Robert William Sievier, of Upper Holloway, London, for improvements in brewing, and also in the production of extracts or infusions for other purposes.—Sealed 9th June.

George Spencer, of Cannon-street West, London, for improvements in the springs of railway carriages, trucks, and waggons. —Sealed 20th June.

George Hinton Bovill, of Abchurch-lane, engineer, for improvements in manufacturing wheat and other grain into meal and flour.—Sealed 20th June.

George Hinton Bovill, of Abchurch-lane, engineer, for improvements in manufacturing wheat and other grain into meal and flour.—Sealed 20th June.

New Patents.

Sealed under Patent Law Amendment Act, 1852.

85. Joseph Brandies, of Great Tower-street, for improvements in the manufacture of sugar and saccharine solutions.—October 1.

889. George Augustus Huddart, of Brynkir, for an improved manufacture of artificial flies.—November 26.

891. Harry Winton, of Dove Mills, Cleveland-street, Birmingham, and Francis Parkes, of Sutton Coldfield-park, for improvements in the manufacture of agricultural and horticultural forks and pronged or toothed instruments and hoes.—Nov. 26.

905. Matthew Samuel Kendrick, of Birmingham, for improvements in grates and fire-places.—November 29.

906. Matthew Samuel Kendrick, of Birmingham, for improvements in lamps and burners, and in the apparatus to be used therewith.—November 29th.

912. William Jeffs, of Hulme, near Manchester, for improvements in manufacturing letters, figures, and ornamental work, and in the mode of attaching the same to wood, stone, iron, and certain other materials.—December 30.

914. James Mayelston Haldon, of Lime-street, for certain improvements in the means of rendering wood imperishable and uninflammable,—being a communication.—December 30.

922. Andrew Edmund Brae, of Leeds, for an apparatus for stopping and detaining, or releasing and setting free, cords, tapes, chains, ropes, or other flexible lines or strings.—Nov. 30.

923. Charles Hart, of Wantage, Berkshire, for a thrashing, straw-shaking, riddling, and winnowing machine combined.—Dec. 1.

925. George Augustus Huddart, of Brynkir, Caernarvonshire, for improvements in the construction of boilers and furnaces for generating steam.—December 1.

926. Charles Walker, of Heap Bridge, near Bury, for improvements in the method of purifying water for steam-boilers and other purposes.

928. William Morris, of Westminster, for improvements in the production of motive power, and in apparatus pertaining thereto.—December 1.

930. John Dable and William Wells, both of Birmingham, for an improvement in rolling metals.—December 2.

934. William Keld Whytehead, of Cornhill, for certain improvements in steam-engines and steam-boilers.—December 2.

937. Ebenezer Poulson, of Monkwearmouth, for an improved mechanical purchase, applicable to working ships' and other pumps, and to similar purposes.— December 2.

940. Noble Seward, of Caherconlish, Limerick, for improvements in applying hydro-pneumatic agency for obtaining motive power.—December 3.

945. Cornelius De Bergue, of Manchester, for improvements in, and applicable to, looms for weaving,—being a communication. —December 3.

952. Duncan McNee, of Kirkintulloch, for a machine for printing with colors on cloth, and which is also applicable for printing ornamental designs on paper.—December 3.

957. John Rowbotham, of Manchester, for improvements in time-keepers and apparatus connected therewith, for ascertaining the attendance on dnty of watchmen and other persons having charge of property,—being a communication.—Dec. 4.

960. Joseph Bentley, of Liverpool, for improvements applicable to fire-arms.—December 4.

964. Isaac Lewis Pulvermacher, of Paris, for improvements in pipes and cigar-holders.—December 4.

967. Richard Archibald Brooman, of Fleet-street, for improvements in saws and saw mills; being a communication.—Dec. 6.

969. André Jaques Amand Gautier, of Paris, for an improved treatment of peat.—December 6.

972. Charles Alfred Jordery, of Paris, for improvements in the construction of the bodies of cravat collars, and stocks and stiffeners, and in the ornamenting of cravat collars and stocks in general.—December 6.

976. John Norman, of Liverpool, for improvements in the mode of making and setting the square sails of ships or vessels of any size and description.—December 6.

980. Thomas Conolly, of Hanover-square, and William Cotter, of Beeston, Nottingham, for improvements in propelling vessels. —December 6.

983. John Henry Johnson, of Lincoln's-inn-fields, for improvements in weaving carpets and other fabrics, and in the machinery or apparatus employed therein,—being a communication. —December 7.

989. Richard Archibald Brooman, of Fleet-street, for improvements in safety-valves,—being a communication.—Dec. 7.

990. Richard Archibald Brooman, of Fleet-street, for improvements in machinery or apparatus for heating, evaporating, torrefying, distilling, and refrigerating,—being a communication.—December 7.

995. John Harrison, Robert Harrison, and Alexander Stewart Harrison, of Dromore, for certain improvements in machinery used in the manufacture of textile and other fabrics.—Dec. 8.

997. William Baddeley, of Islington, for improvements in apparatus for the conversion of rectilinear into circular motion,—being a communication.—December 8.

998. Donald Beatson, of Mile End, and Thomas Hill, of Southampton, for improvements in the means of propelling ships and other floating vessels.—December 8.

1002. James Spotswood Wilson, of Tavistock-place, for improvements in propelling.—December 8.

1004. Joseph Hopkins, of Worcester, for improvements in obtaining a straight line parallel to the axis of the earth, or in rendering the axis of a tube or of a telescope parallel thereto. —December 8.

1008. William Baddeley, of Islington, for improvements in the manufacture of metal pipes,—being a communication.—Dec. 9.

1009. William Allchin, of Northampton, for improvements in agricultural and other steam-engines.—December 9.

1014. Thomas Masters, of Oxford-street, for improvements in machinery or apparatus for cleaning knives and other steel articles.—December 9.

1020. Richard Archibald Brooman, of Fleet-street, for improvements in evaporating apparatus,—a communication.—Dec. 10.

1021. Julien Boilesve, of South-street, Finsbury, for an improved desiccating apparatus,—being a communication.—Dec. 10.

1027. William Sorrell, of Kingsland, for improvements in furnaces and fire-places for consuming smoke.—December 11.

1028. Archibald White, of Great Missenden, for improvements in apparatus for retarding and stopping railway trains.—December 11.

1033. Charles Ritchie, of Hackney, for improvements in apparatus for measuring fluids.—December 11.

1037. Joseph Hamblet and William Dean, both of Oldbury, for an improvement in the manufacture of bricks.—December 13.

1042. Jules Lejeune, of Auteuil, near Paris, for a new machine for washing house linen, and all kinds of textile articles that are employed in making them.—December 13.

1052. William Irlam, of Manchester, for improvements in railways.—December 14.

1059. Joseph Paul Marc Floret, of Paris, for an improved method of producing simultaneously gas-light and lime or plaster.—December 14.

1060. William Edward Middleton, of Birmingham, for a new or improved lubricator,—being a communication.—December 15.

1061. Phillippe D'Homme, of Paris, for certain improvements in the manufacture of window-blinds, curtains, and hangings,—being a communication.—December 15.

1062. Susan Walker, of Horsham, for improvements in clogs and pattens.—December 15.

1065. John Mason, of Rochdale, for improvements in the processes of bleaching and dyeing textile materials and fabrics.—December 15.

1067. Charles James Wallis, of Hand-court, Holborn, for improvements in machinery for amalgamating, mixing, and grinding substances together.—December 15.

1073. André Cointry, of Nantes, for improvements in the manufacture of bread and biscuits.—December 16.

1076. John Healey, of Bolton-le-Moors, for the application of glass and enamel to the flyers and other parts of machinery used in the preparing, spinning, doubling, winding, warping, dressing, and weaving of cotton, wool, flax, silk, and other fibrous materials.—December 16.

1077. Richard Blades, of Liverpool, for certain improvements in the method of cleansing sewers and drains, and in the machinery or apparatus connected therewith.—December 16.

1078. James Stevens, of Birmingham, for improvements in grinding and polishing lenses.—December 16.

1080. Thomas Motley, of Bristol, for improvements in constructing the tablets, letters, and figures for indicating the names, designations, or numbers of streets, houses, buildings, and other places.—December 16.

1081. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for a new system of stoppering bottles and other vessels,—being a communication.—December 16.

1089. Frederick Joseph Bramwell, of Millwall, for improvements in steam-engines.—December 17.

1098. George Thomson, of Dalston, for a machine for cutting wood.—December 18.

1110. George Lingard, of Birmingham, for improvements in taps, and apparatus connected therewith, for admittimg air to beer and other liquors under draught.—December 20.

1117. Robert Powell, of Berwick-street, for improvements in coats and outer garments.—December 20.

1118. Ferdinand D'Albert, of South-street, for a certain chemical combination for replacing indigo, which he calls "D'Albert blue."—December 21.

1127. John Roydes, of Greengate, near Rochdale, for improvements in machinery or apparatus for drawing cotton and other fibrous substances.—December 21.

1131. John Roberts, of Upnor, for improvements in apparatus for preserving animal and vegetable matters, and for cooling wines and other liquids.—December 22.

1133. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for forging iron and other metals,—being a communication.—December 22.

1134. John Filmore Kingston, of Carrol County, Maryland, United States of America, for improvements in obtaining motive power by electro-magnets.—December 22.

1137. Frederick Ayckbourn, of Guildford-street, Russell-square, for improvements in rendering certain materials impervious by air or water.—December 22.

1138. Thomas Vicars, the elder, and Thomas Vicars, the younger, both of Liverpool, for improvements in baking-ovens, and apparatus for placing the bread, biscuits, or other articles to be baked therein.—December 22.

1140. John Moore Hyde, of Bristol, for improvements in steam-engines and the production of steam for the same.—Dec. 22.

1141. Alfred John Hobson, of Wallsall, for a new or improved metallic bedstead.—December 23.

1143. Alexander Deutsch, of Paris, for improvements in treating oil of colza, and similar oils.—December 23.

1145. William Westley and Richard Bayliss, both of Derby, for an improved fastener, applicable to the fastening of window-sashes, tables, and other similar purposes.—December 23.

1154. John Lowther Murphy, of Birmingham, for an improvement in drawing off liquids from barrels and other vessels.—December 24.

1159. Robert Griffiths, of Great Ormond-street, for improvements in giving motion to drills.—December 24.

1166. Pierre Charles Nesmond, of Bellac, France, for improvements in machinery applicable to the manufacture of ice, and to refrigerative purposes generally.—December 24.

1169. John Frederick Gordon, of Strangford, county Down, for an invention for facilitating the turning of four-wheeled carriages, and bringing the front and hind wheels nearer to each other; entitled "the castor axle."—December 27.

1172. John Mason, of Rochdale, for improvements in machinery or apparatus for preparing cotton and other fibrous substances for spinning.—December 28.

1197. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for certain improvements in machinery for grinding and reducing gold quartz to an impalpable powder, and amalgamating the said ground quartz with quicksilver; the same being applicable also to the pulverizing and washing of ores,—being a communication.—December 29.

1199. Thomas Walker, of Birmingham, for improvements in apparatus for regulating the speed of steam-engines.—Dec. 30.

1200. Thomas Walker, of Birmingham, for improvements in apparatus for regulating the dampers of steam-boiler and other evaporating furnaces; which apparatus is also applicable for indicating the pressure of steam or other fluids.—December 30.

1201. Henry Hutchinson, of Sheffield, for improvements in machines for washing bottles.—December 30.

1202. James Ward and William Burman, both of Stratford-on-Avon, for certain improvements in machinery for making bricks and tiles.—December 30.

1204. Julius Singer, of Mabledon-place, Burton-Crescent, for improvements in wearing apparel.—December 30.

1211. James Lord, of the Inner Temple, for improvements in carriage-steps.—December 31.

1853.

1. William Wilkinson, of Nottingham, for improvements in taps and other apparatus for filtering and drawing off liquids.—January 1.

13. Lazare François Vaudelin, of Upper Charlotte-street, Fitzroy-square, for improvements in apparatus for retarding and stopping railway carriages.—January 3.

27. Frederick Arnold, of Devonport, for improvements in heating the water in a bath or other vessel.—January 5.

29. William Bendwell, of Great Queen-street, Westminster, for improvements in treating sewage waters and matters.—Jan. 5.

44. Charles De Bergue, of Dowgate-hill, London, for improvements in the permanent way of railways.—January 7.

47. Charles William Lancaster, of New Bond-street, for an appendage to bullet moulds.—January 7.

48. George Stewart, of Enniskillen, for improvements in railways, and in the propulsion of engines, carriages, and other vehicles thereon.—January 7.

51. Hezekiah Marshall, of Canterbury, for certain improvements in the transmission and emission of air and sound.—January 7.

57. William Henderson, of Bow-common, for improvements in manufacturing sulphuric acid and copper from copper ores, reguluses, and matts.—January 8.

59. Francis Parker, of Northampton, and William Dicks, of Leicester, for improvements in boots, shoes, and that kind of spatterdashes termed Antigropelos.—January 8.

60. Richard Walker, of Birmingham, for an improvement in the manufacture of buttons.—January 8.
69. Joseph Beattie, of Lawn-place, South Lambeth, for certain improvements for economizing fuel in the generation and treating of steam.—January 11.
71. Henry Constantine Jennings, of Great Tower-street, for improvements in separating the more fluid parts of fatty and oily matters.—January 11.
84. George Augustus Huddart, of Brynkir, for improvements applicable to steam generators.—January 12.
96. John Walker Wilkins, of Hampstead, for improvements in electric telegraphs, and in the instruments used in connection therewith.—January 13.
102. Frederick Joseph Bramwell, of Millwall, and Isham Baggs, of Liverpool-street, for improvements in steam machinery used for driving piles, hammering, stamping, and crushing.—January 14.
106. Hyppolyte Charles Vion, of Paris, for certain improvements in apparatus for refrigerating.—January 15.
127. John Sheringham, of Edwardes-square, Kensington, for certain improvements in stove-grates.—January 18.
135. Celestin Malo, of Dunkerque, for improvements in steam generators.—January 19.
138. Peter Rothwell Jackson, of Salford, for improvements in the manufacture of hoops and tyres for railway wheels and other purposes.—January 20.
142. Richard Mountford Deeley, of Audman Bank, Staffordshire, for improvements in the grates of furnaces used in the manufacture of glass.—January 20.
145. Georges Edouard Gazagnaire, of Marseilles, for improvements in the manufacture of nets for fishing and other purposes,—being a communication.—January 20.
159. Rueben Plant, of Brierly Hill, for improvements in the construction of glass-house furnaces.—January 21.
161. Louis Jules Joseph Malegue, of Paris, for a certain coloring composition for dyeing tissues, or stuffs of silk and cotton.—January 22.
162. Benjamin Quinton, of Birmingham, for a new or improved fastening for brooches and other articles of jewellery and dress.—January 22.
167. John Medworth, of Campden-hill, Kensington, and Lawrence Lee, of New Oxford-street, for improvements in lithographic presses.—January 22.
169. Peter Hubert Desvignes, of Lewisham, and Francis Xavier Kukla, of the same place, for improvements in galvanic batteries.—January 22.
171. Henry Brinsmead, of St. Giles-in-the-Wood, Devonshire, for an invention for reaping all kinds of corn.—January 24.
179. John Henry Johnson, of Lincoln's-inn-fields, for improve-

ments in aerial navigation, and in the machinery or apparatus connected therewith,—being a communication.—January 24.

208. William Galloway and John Galloway, of Manchester, engineers, for improvements in steam-engines and boilers.—January 27.

209. Casimir Noël, of Paris, for a new regulating bit.—Jan. 28.

218. Thomas Symes Prideaux, of Garden-road, St. John's-wood, for improvements in the manufacture of iron.—January 28.

238. Lewis Jennings, of Fludyer-street, for an improved construction of lock.—January 29.

243. David Stevens Brown, of Alexandrian Lodge, Old Kent-road, for certain improvements in barometers; part of which invention is applicable to the registry of other fluctuations than those of barometers.—January 31.

255. Edmund Leach, of Rochdale, for improvements in the mode or method of preparing and spinning cotton, wool, flax, and other fibrous substances, and in the machinery or apparatus employed therein.—January 31.

283. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in furnaces and apparatus combined therewith, for making wrought iron directly from the ore, and for collecting and condensing the oxides or other substances evaporated in the process of deoxidizing iron or other ores,—being a communication.—February 2.

285. John Verinder Kiddle, of Elder-street, Norton Folgate, for improvements in cocks or taps.—February 2.

288. Richard Archibald Brooman, of Fleet-street, for improvements in expansion valves for steam-engines,—being a communication.—February 2.

302. William Brown, of Birmingham, for an improvement or improvements in the construction of metallic bedsteads.—Feb. 4.

305. Philip Webley, of Birmingham, for improvements in repeating pistols and other fire arms.—February 4.

307. John Perkins, of Manchester, for improvements in the treatment of certain bituminous mineral substances, and in obtaining products therefrom.—February 4.

309. John Dudgeon, of Cornhill, for improvements in machinery used for raising propellers.—February 4.

310. Jacob Vale Asbury, of Enfield, for improvements in railway carriages.—February 4.

320. John Whitehouse the elder, and John Whitehouse the younger, of Birmingham, for certain improvements in the manufacture of knobs for doors and other like uses; part of which improvements is applicable to the manufacture of certain articles of earthenware.—February 5.

324. John Campbell, of Bowfield, Renfrew, for improvements in the treatment or finishing of textile fabrics and materials.—February 5.

326. Alexander Parkes, of Burry Port, Carmarthenshire, for im-

provements in the separation of certain metals from their ores or other compounds.—February 5.

327. Edward Palmer, of Woodford Green, for improvements in carriages used on railways.—February 5.

328. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in metal musical wind instruments, to be called "Besson's system,"—being a communication,—February 5.

330. William Romaine, of Sackville-street, Piccadilly, for improvements in rendering wood more durable and uninflammable.—February 7.

341. Henry Pooley, of Liverpool, for improvements in weighing machines,—being partly a communication.—February 9.

346. John Seaward, of Poplar, for improvements in marine engines.—Feb. 9.

348. Charles Iles, of Birmingham, for improvements in pointing wire.—February 9.

349. John Webster, of Ipswich, for improvements in treating animal matters and in manufacturing manure.—February 9.

352. Charles Cuylits, of Antwerp, for improvements in apparatus for regulating or governing the speed of steam or other engines,—being a communication.—February 10.

357. William Ball, of Ilkeston, Derbyshire, for improvements in machinery for producing looped fabrics.—February 10.

359. Robert Ash, of High-street, Southwark, for improvements in stopping bottles and other vessels.—February 10.

360. George Hutchinson, of Glasgow, for improvements in treating oils and other fatty matters.—February 10.

363. William Potts, of Birmingham, for improvements in sepulchral and other commemorative monuments.—February 10.

365. Sir James Murray, of Dublin, for improvements in deodorizing cod liver oil, in rendering it more agreeable and easier to use, either by itself or mixed, and so as to be capable of being administered in larger quantities and with greater success.—February 11.

367. William Choppin, of the City of London, for improvements in locks.—February 11.

368. Robert Davis Rea, of St. George's-road, Southwark, for improvements in bits.—February 11.

375. George Lee Lysnar, of Park-street, Grosvenor-square, for improvements in swivel hooks and such like fasteners.—Feb. 12.

379. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in apparatus to be employed for veneering surfaces,—being a communication.—February 14.

380. Charles John Burnett, of Edinburgh, for certain improvements in apparatus or mechanism for driving machinery through the agency of water.—February 14.

381. Peter Armand le Comte de Fontainmoreau, of South-street, Finsbury, for certain improvements in treating fibrous substances,—being a communication.—February 14.

388. John Bethell, of Parliament-street, for improvements in obtaining copper and zinc from their ores,—being a communidation.—February 15.

395. Alphonse Rene le Mire de Normandy, of Judd-street, for improvements in the manufacture of articles made of gutta-percha,—being partly a communication.—February 15.

396. William Blissett Whitton, and George Samuel Whitton, of Princes-street, Lambeth, for improvements in the manufacture of sewer and other pipes.—February 15.

401. Job Cutler, of Birmingham, for improvements in the manufacture of spoons and forks, and other similar articles for domestic use.—February 16.

403. George Gray Mackay, of Grangemouth, near Falkirk, for improvements in the construction of drain-pipes.—Feb. 16.

404. Joseph Skertchly, of Kingsland, for improvements in copying presses.—February 16.

406. Édouard Sy, of Clifford-street, for improvements in bookbinding.—February 16.

407. John George Perry, of Westbourne-street, for improvements in bookbinding, to facilitate the finding of places in books.—February 16.

412. William Bridges Adams, of Adam-street, Adelphi, for improvements in railways.—February 17.

415. Matthias Walker, of Horsham, for improvements in vessels or apparatus for containing and preserving ale, beer, and other liquors.—February 17.

418. Thomas Clarke Ogden, of Manchester, and William Gibson, of the same place, for certain improvements in machinery or apparatus for spinning cotton and other fibrous materials.—February 17.

422. Isaac Frost, of Tavistock-terrace, Upper Holloway, for improvements in reaping or cutting crops.—February 17.

427. Charles Kinder, of Chesterfield, for improvements in mantel or chimney-pieces.—February 18.

428. Henry Noad, of Stratford, for improvements in treating corn or grain, and obtaining products therefrom.—Feb. 18.

429. Nathan Dutton, of Liverpool, for improvements in the manufacture and application of dowels and machinery connected therewith; parts of which machinery are applicable to other purposes.—February 18.

431. Frank Clarke Hills, of Deptford, and George Hills, of Lee, for certain improvements in refining sugar, and in preparing materials applicable to that purpose.—February 19.

433. Charles Cowper, of Southampton-buildings, for improvements in the manufacture of oxide of zinc or zinc-white, and in apparatus for that purpose,—being a communication.—February 19.

434. Charles Nightingale, of Wardour-street, for certain improvements in drying and heating certain substances or articles.—February 19.

436. Pierre Auguste Tourniere, of Kennington-terrace, for improvements in propelling.—February 19.

437. Wright Jones, of Pendleton, for improvements applicable to steam-pipes used for warming, drying, or ventilating.—Feb. 21.

438. Samuel Rodgers Samuels and Robert Sands, both of Nottingham, for improvements in looms for weaving.—Feb. 21.

446. Benjamin Barton, of Old Kent-road, for an improved bath; which can also be used as a life-boat.—February 21.

448. John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of wire.—Feb. 21.

449. William Wilkinson, of Nottingham, for improvements in the manufacture of ropes, bands, straps, and cords.—Feb. 21.

450. James Hudson, of Halifax, and Thomas Bamford Hudson, of Malton, for improvements in the manufacture of bricks, tiles, and drain-pipes or tubes.—February 22.

451 Pierre Frederick Gougy, of Castle-street, and David Combe, of King-street, for improvements in apparatus for skidding or stopping wheels of carriages and other vehicles.—Feb. 22.

453. John Richard Cochrane, of Glasgow, for improvements in the manufacture or production of ornamental or figured fabrics. —February 22.

456. Edwin Stanley Brookes, Joseph Black, George Stevenson, and William Jones, all of Loughborough, for improvements in machinery for the manufacture of looped fabrics.—Feb. 23.

458. Reuben Plant, of Brierley-hill, for improvements in safety-lamps.—February 23.

459. Robert Milligan, of Harden Mills, Bingley, for improvements in apparatus for washing slivers of wool.—February 23.

461. Asa Willard, of Saint John, New Brunswick, America, for improvements in machines for manufacturing butter, to be called "A. Willard's butter-machine."—February 23.

464. William Spence, of Chancery-lane, for certain improvements in machines for thrashing and winnowing corn and other agricultural produce,—being a communication.—February 24.

469. Thomas De la Rue, of Bunhill-row, for improvements in producing ornamental surfaces to paper and other substances. —February 24.

476. John Grist, of Hoxton, for improvements in machinery for the manufacture of casks, barrels, and other similar vessels.—February 25.

477. William Symington, of Gracechurch-street, for improvements in preserving milk and other fluids.—February 25.

483. Frederick Goodell, of Half Moon-street, for an improved apparatus for the distillation of rosin oil, and for an improved method of bleaching and deodorizing the same during the process of manufacture,—partly a communication.—February 25.

487. Joseph Brandeis, of Great Tower-street, for improvements in the manufacture and refining of sugar.—February 26.

491. The Honourable James Sinclair, commonly called Lord

Berriedale, of Hill-street, for improvements in weaving.—February 26.

493. Charles Tetley, of Bradford, for improvements in obtaining power by steam and air.—February 26.

494. Charles Tetley, of Bradford, for improvements in the manufacture of bobbins.—February 26.

496. Admiral the Earl of Dundonald, of Belgrave-road, for improvements in producing compositions or combinations of bituminous, resinous, and gummy matters, and thereby obtaining products useful in the arts and manufactures.—Feb. 26.

501. Edward Hammond Bentall, of Heybridge, Essex, for improvements in harrows.—February 28.

505. Samuel Cunliffe Lister, of Manningham, Yorkshire, for heating and making cards.—February 28.

507. Thornton Littlewood and Charles Littlewood, of Rochdale, for improvements in machinery or apparatus used in the preparation of wool, silk, flax, and mohair, to be spun.—March 1.

510. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in capstans,—being a communication. —March 1.

512. William Rowett, of Liverpool, for improvements in making paddle-wheels for vessels propelled by motive power, which is called "the cylinder paddle-wheel."—March 1.

515. Robert Lewin Bolton, of Liverpool, for a new mode of obtaining and using power by explosion of gases.—March 1.

517. Charles Henry Hall, of Liverpool, for an improved apparatus for cooking by gas or vapour.—March 2.

522. Edward Duke Moore, of Ranton Abbey, Staffordshire, for an improved mode of treating the extract of malt and hops.—March 2.

523. Lewis Jennings, of Fludyer-street, for an improved apparatus for regulating the speed of machinery.—March 2.

525. Robert Waddell, of Liverpool, for improvements in steam-engines.—March 2.

535. Samuel Colt, of Spring-gardens, for improvements in rotating breech fire-arms,—partly a communication.—March 3.

536. Samuel Colt, of Spring-gardens, for an improved construction of blower,—being a communication.—March 3.

537. Samuel Colt, of Spring-gardens, for improved machinery for forging metals,—partly a communication.—March 3.

538. Samuel Colt, of Spring-gardens, for improvements in rotatating breech fire-arms,—partly a communication.—March 3.

540. William Edward Newton, of the office for Patents, Chancery-lane, for improvements in primers for fire-arms,—being a communication.—March 3.

542. Thomas Crick, of Leicester, for improvements in the manufacture of boots, shoes, clogs, and slippers.—March 3.

544. John Hinks and George Wells, both of Birmingham, for a new or improved metallic pen.—March 4.

546. George Elliott, of St. Helen's, Lancashire, for certain improvements in manures.—March 4.
552. James Boydell, of Smethwick, for improvements in th construction of bedsteads—March 4.
555. John Gedge, of Wellington-street, Strand, for improvements in the construction of fire-arms, and in the means of loading the same,—being a communication.—March 5.
562. Richard Barter, of St. Ann's Hill, Blarney, for improvements in cutting roots and other vegetable substances.—March 7.
568. Godfrey Simon and Thomas Humphreys, of Pennsylvania, America, for improvements in carriages.—March 7.
570. Joseph John William Watson, of Old Kent-road, for improvements in illuminating apparatus, and in the production of light.—March 7.
575. Augustino Carosio, of Genoa, for a hydro-dynamic battery, or new or improved electro-magnetic apparatus, which, with its products, are applicable to the production of motive power, of light, and of heat.—March 7.
584. Samuel Cunliffe Lister, of Bradford, Yorkshire, for improvements in machinery used in washing wool.—March 8.
585. John Wright, of Camberwell, for improvements in the construction of bedsteads and other frames.—March 8.
586. Alexander Samuelson, of Hull, for improvements in the manufacture of bricks and tiles.—March 8.
587. Frederick William Emerson, of Penzance, for improvements in obtaining tin from ores.—March 8.
592. James Kimberley, of Birmingham, for a new or improved gas stove.—March 9.
593. James Hogg, jun., of Nicholson-street, Edinburgh, for certain improvements in machinery or apparatus for cutting paper and other substances.—March 9.
596. François Valtat and François Marie Rouillé, of Rue Rambuteau, Paris, for improvements in the construction of the combs of looms for weaving.—March 9.
597. Joseph Shuttleworth, of Lincoln, for improvements in appendages to portable machines for thrashing, shaking, and winnowing corn.—March 9.
600. Theophilus John Nash, of High Holborn, for improvements in churns.—March 9.
601. George Collier, of Halifax, for improvements in the manufacture of carpets and other fabrics.—March 9.
605. George Collier and Samuel Thornton, of Halifax, for improvements in spinning, roving, doubling, and twisting cotton, worsted, flax, and other fibrous materials.—March 9.
607. James Walmsley, of Scout Newchurch, near Manchester, for improved machinery and arrangements for block printing.—March 10.
608. John Powis and Jabus Stanley James, both of Watling-street, for improvements in machinery for slotting, tenoning, morticing, grooving, drilling, boring, and vertical planing.—March 10.

609. Edward Taylor Bellhouse, of Manchester, for improvements in iron structures.—March 10.

610. Thomas Butler Dodgson, of Upper Clapton, for improvements in roads or ways, pavements, and footpaths generally.—March 10.

611. George Collier, of Halifax, for improvements in machinery or apparatus used in weaving.—March 10.

612. The Honorable William Erskine Cochrane, of Albany-street, and William Marshall Cochrane, of Kingston, for improvements in girths or pads for retaining saddles in their places.—Mar. 10.

616. Francis Preston, of Manchester, for improvements in the manufacture of bobbins and spools.—March 11.

619. Moses Poole, of Avenue-road, Regent's-park, for improvements in apparatus for serving oysters and other shell-fish,—being a communication.—March 11.

620. John Gilby, of Beverley, for improvements in fire-arms.—March 12.

627. George Michiels, of Holywell-street, for improvements in obtaining oxygen for manufacturing purposes.—March 12.

628. Thomas Hunt, of Leman-street, for improvements in the construction of sights for fire-arms.—March 12.

629. Thomas Rhodes, of Leeds, for improvements in the manufacture of manure.—March 12.

630. Robert Christopher Witty, of Portland-place, Wandsworth-road, for improvements in the manufacture of gas.—Mar. 12.

631. James Murdoch, of Staple-inn, for an improved construction of portable voltaic batteries,—a communication.—March 12.

643. Thornton John Herapath, of Bristol, for improvements in treating sewage, and in manufacturing manure therefrom.—March 15.

650. John Vanden Hielakker, of Brussels, for an improved excentric engine, applicable to the purposes of general navigation.—March 16.

651. Charles Heard Wild, of St. Martin's-lane, for improvements in fishes and fish-joints for connecting the rails of railways.—March 16.

654. Samuel Colt, of Spring-gardens, for improved apparatus for heating and annealing metals.—March 16.

655. John Oliver, of Newcastle-upon-Tyne, for improvements in the manufacture of a red pigment, commonly called Venetian red.—March 16.

659. William Blinkhorn, of Sutton, Lancashire, for certain improvements in the construction of furnaces and annealing kilns employed in the manufacture of glass.—March 17.

660. George Johnson, of Stockport, for certain improvements in looms for weaving.—March 17.

662. John Bottomley, of Bradford, for improvements in the manufacture of figured or ornamented piled or plushed fabrics.—March 17.

666. William King Westly, of Leeds, for an improved comb or gill for heckling, drawing, roving, and otherwise preparing to be spun, hemp, flax, tow, silk, wool, and other fibrous substances.—March 18.

667. John Henry Johnson, of Lincoln's-inn-fields, for improvements in steam-engines,—being a communication.—March 18.

670. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in power looms,—a communication.—March 18.

672. George Rock Lucas, of Dronfield, near Sheffield, for improvements in the method of raising water and other materials from mines.—March 18.

677. George Ross, of Hatton-garden, for an improved manufacture of lubricating oil, and a mode or modes of applying such oil to the purposes of lubrication,—a communication,—Mar. 18.

678. George Mackay, of Buckingham-street, Strand, for improvements in the manufacture of iron,—a communication.—Mar. 18.

685. Samuel Radcliffe and Knight William Whitehead, both of Oldham, for certain improvements in machinery or apparatus for grinding or setting the surfaces of cylinders and rollers employed in carding-engines.—March 19.

686. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved construction of oil lamp,—being a communication.—March 19.

689. Thomas Sykes, of Castleford, for improvements in the treatment of soapy and greasy waters,—being a communication.—March 21.

690. Moses Poole, of the Regent's Park, for improvements in generating steam and other vapours,—being a communication. March 21.

691. Jean Marie Durnerin, of Paris, for improvements in apparatus for extracting liquid out of solid substances, specially applicable to the treatment of fatty matters.—March 21.

692. Moses Poole, of the Regent's Park, for improvements in obtainiug power where air is employed,—being a communication.—March 21.

693. Isaac Taylor, of Stanford Rivers, for improvements in machinery for printing woven and other fabrics.—March 21.

698. Samuel Mc Cormick, of Dublin, for improvements in manufacturing screws, bolts, spikes, and rivets, and other similar articles, and in the machinery or apparatus used for such manufacture; parts of which machinery are applicable for forming screw-threads, mouldings, and ornaments on metal.—Mar. 22.

701. William Johnson, of Lincoln's-inn-fields, for improvements in rolling and shaping malleable metals,—being a communication.—March 22.

702. Nicholas G. Norcross, of Lowell, Massachusetts, America, for certain improvements in machinery for planing or reducing boards or timber.—March 22.

703. Frederick Futvoye, of Regent-street, for an improved apparatus to be employed in games of chance.—March 22.

711. Antoine François Jean Claudet, of Regent-street, for improvements in stereoscopes.—March 23.

714. William Prior Sharp, of Manchester, for certain improvements in machinery for spinning and doubling cotton and other fibrous substances.—March 24.

715. Robert Grundy, of Hindley, Lancashire, and James Jones, of Warrington, for improvements in machinery for preparing, spinning, and doubling cotton and other fibrous materials.—March 24.

718. William Keates, of Liverpool, for improvements in the manufacture of tubes and mandrils,—being partly a communication.—March 24.

719. Charles Augustus Holm, of Cecil-street, Strand, for improvements in propelling vessels.—March 24.

732. James Worrall, jun., of Salford, for certain improvements in the method of preparing, treating, and finishing cut, piled, or raised fustians, and other similar goods or fabrics, and in the machinery or apparatus connected therewith.—March 26.

735. David Stephens Brown, of the Old Kent-road, for certain improvements in engines to be worked by steam or any other elastic fluid; which invention also includes the apparatus for generating such steam or other elastic fluid.—March 28.

736. Augustin Chrysostome Bernard, and Jacques Marie Pierre, Albéric de St. Roman, of Paris, for an improved mode of giving publicity.—March 28.

739. Samuel Fox, of Deepcar, near Sheffield, for an improvement in the frames of umbrellas and parasols.—March 28.

740. George Edward Dering, of Lockleys, for improvements in preserving or preventing decomposition in vegetable and animal substances and matters.—March 28.

741. George Edward Dering, of Lockleys, for improvements in the manufacture of certain salts and oxides of metals.—Mar. 28.

762. James Bowron, of South Shields, for improvements in the manufacture of crown, sheet, plate, and bottle-glass.—Mar. 30.

763. Christopher Nickels, of the York-road, for improvements in weaving narrow fabrics.—March 30.

764. Robert Dalglish, of Glasgow, for an improvement in dyeing.—March 30.

768. James Worrell, jun., of Salford, for certain improvements in the method of preparing, treating, and finishing certain textile fabrics called cords, thicksets, velveteens, and beaverteens.—March 30.

771. Joseph Rylands, of Kingston-upon-Hull, for improvements in yards and spars of ships and other vessels.—March 31.

775. George Fergusson Wilson, of Belmont, Vauxhall, and James Freeman Lee, of the same place, for improvements in the manufacture of night-lights and their cases.—April 1.

776. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in treating certain oily matters, and in the manufacture of oil.—April 1.

779. William Crofts, of Derby-terrace, Nottingham Park, for improvements in weaving.—April 1.

783. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in the manufacture of cloths, and in the preparation of wool.—April 1.

784. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in treating certain greasy matters, and in the manufacture of candles.—April 1.

785. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in the manufacture of night-lights, and in apparatus to be used therewith.—April 1.

793. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in engines to be worked by air or gases,—being a communication.—April 4.

796. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in producing plates or surfaces, which may be used as printing or embossing surfaces, or as door-plates, dial or number-plates, or other plates or surfaces bearing inscriptions or devices of various kinds,—being a communication.—April 4.

798. Robert William Sievier, of Upper Holloway, and James Crosby, of Manchester, for improvements applicable to looms for the manufacture of textile fabrics.—April 4.

799. Jesse Ross, of Keighley, and Thomas Robert Hafford Ross, of Leicester, for certain improvements in machinery or apparatus for combing wool, cotton, silk, flax, and other suitable fibrous materials.—April 4.

801. William Walker, of Leeds, for improvements in drying malt.—April 4.

804. Charles May, of Great George-street, for improvements in machinery for manufacturing and rolling iron.—April 4.

818. William Johnson, of Lincoln's-inn-fields, for improvements in weaving, and in the machinery employed therein,—being a communication.—April 5.

823. Frederick Albert Gatty, of Accrington, for improvements in printing or producing colours on textile fabrics.—April 6.

827. William Radford, of Buckingham-street, for improvements in the construction of metallic beams or bracings and metallic sheets or plates, applicable to the building of ships and other structures where lightness and strength are required.—April 6.

836. William Henry Wells, Edward Mann, and John Harman, all of Wandsworth, for improvements in grinding wheat and other grain.—April 7.

CELESTIAL PHENOMENA FOR JULY, 1853.

D.	H.	M.	
1			Clock before the ☉ 3m. 27s.
—			☽ rises 1h. 1m. M.
—			☽ passes mer. 8h. 10m. M.
—			☽ sets 3h. 35m. A.
	8	57	♃'s first sat. will em.
2	0	56	♄ in conj. with the ☽ diff. of dec. 0. 1. S.
	4	0	☽ in Apogee
	18	0	☉ in Apogee
	19	28	♂ in conj. with the ☽ diff. of dec. 1. 6. N.
5			Clock before the ☉ 4m. 12s.
—			☽ rises 2h. 45m. M.
—			☽ pass mer. 11h. 17m. M.
—			☽ sets 7h. 54m. A.
	11	25	♃'s first sat. will em.
6	10	54	Ecliptic conj. or ● new moon
7	5	22	♀ in conj. with the ☽ diff. of dec. 2. 6. S.
	22	26	☿ in conj. with the ☽ diff. of dec. 2. 55. S
8	11	33	♃'s second sat. will em.
10			Clock before the ☉ 5m. 0s.
—			☽ rises 7h. 58m. M.
—			☽ pass mer. 3h. 29m. A.
—			☽ sets 10h. 43m. A.
11	4		♂ in the ascending node.
12	22	9	Juno in conj. with the ☉
13	1	20	♃'s second sat. will em.
	10	15	☽ in □ or first quarter
14			Occul. 2 Libræ, im. 10h. 25m. em. 10h. 56. em.
14	13	56	Pallas in □ with the ☉
15			Clock before the ☉ 5m. 36s.
—			☽ rises 2h. 34m. A.
—			☽ pass mer. 7h. 31m. A.
—			☽ sets Morn.
	17	50	☿ in the ascending node
16			Mercury, R. A., 9h. 30m. dec. 14. 43. N.
—			Venus, R. A., 8h. 55m. dec. 18. 54 N.
—			Mars, R. A., 4h. 58m. dec. 22. 46. N.
—			Vesta, R. A., 7h. 0m. dec. 22 26. N.
—			Juno, R. A., 7h. 32m. dec. 14. 0. N.
—			Pallas, R. A., 14h. 11m. dec. 20h. 10 N.
—			Ceres, R. A., 14h. 14m. dec. 7. 52. S.
16			Jupiter, R. A., 17h. 11m. dec. 22. 28. S.
—			Saturn, R. A., 3h. 35m. dec. 17. 17. N.
—			Uranus, R. A., 2h. 35m. dec. 14. 45. N.
—			Mercury pass mer. 0h. 16m.
—			Venus pass mer. 0h. 40m.
—			Mars pass mer. 21h. 50m.
—			Jupiter pass mer. 11h. 30m.
—			Saturn pass mer. 21h. 53m.
—			Uranus pass mer. 20h. 53m.
17	5		♃ in conj. with the ☽ diff. of dec. 0. 7. N.
—			Occul. B.A.C., 5831, im. 8h. 56m. em. 10h. 7m.
—			Occul. *b* Ophiuchi, im. 12h. 59m. em. 13h. 59m.
	20	0	☽ in Perigee
20			Clock before the ☉ 6m. 0s.
—			☽ rises 8h. 39m. A.
—			☽ pass mer. Morn.
—			☽ sets 3h. 19m. M.
	1	54	Ecliptic oppo. or ○ full moon
	17	6	☿ greatest elong. 26. 58. E.
21	9	44	♃'s first sat. will em.
	19	51	♀ greatest hel. lat. N.
23	10	17	♃'s third sat. will im.
25			Clock before the ☉ 6m. 10s.
—			☽ rises 10h. 35m. A.
—			☽ passes mer. 3h. 59m. M.
—			☽ sets 9h. 51m. M.
	21	44	☿ in Aphelion
27	10		☽ in □ or last quarter
	23	49	♅ in conj. with the ☽ diff. of dec. 2. 49. N.
28	11	39	♃'s first sat. will em.
29	11	28	Ceres in □ with the ☉
	13	24	♄ in conj. with the ☽ diff. of dec. 0. 25. S.
	20	0	☽ in Apogee
30			Clock before the ☉ 6m. 6s.
—			☽ rises Morn.
—			☽ passes mer. 7h. 34m. M.
—			☽ sets 3h. 39m. A.
—			Vesta in the ascending node.
31	19	11	♂ in conj. with the ☽ diff. of dec. 0. 28. S.
	20	41	☿ in conj. with ♀ diff. of dec. 5. 4. S.

J. LEWTHWAITE, Rotherhithe.

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No. CCLX.

RECENT PATENTS.

To Edward Thomas Loseby, *of Gerrard-street, Islington, horologist, for improvements in the construction of time-keepers, and in cases to be applied thereto.*—[Sealed 9th December, 1852.]

This invention refers, firstly, to an improvement on that part of chronometers, watches, and clocks called the compensation-balance,—the object being to remove a defect in the ordinary compensation, which causes the chronometer to gain in intermediate temperatures when perfectly adjusted for the extremes; on account of the balance-spring losing elastic force at an accumulating rate over the effect produced by the compound laminæ of the balance. This defect is removed by applying to the balance curved tubes containing mercury or other fluid, in addition to the ordinary compensation,—the tubes being arranged in such a position as to cause the mercury, on expanding, by reason of an increase of temperature, to approach the centre of the balance at an accumulating rate, corresponding to the law of alteration in the elastic force of the spring.

In Plate IV., this novel mode of compensation is shewn in plan view at fig. 1, and in side elevation at fig. 2. *a*, is the bar of the balance; *b, b*, is the compound rim of the balance; *c, c*, are timing-screws; and *d, d*, are weights for adjusting the ordinary compensation; *e, e*, are the supplementary compensation-tubes, attached to the balance by the fittings *f*, and *g*, and screws *h, h*. *i, i*, are screws, which connect the parts *f*, and *g*, together, and also permit of the adjustment, laterally, of the tubes *e*. The action of this improvement will be bet-

ter understood by reference to the diagram, fig. 3, where the line *a*, represents the diameter of the balance; *b*, its circumference; and *c*, the curve of the tube tending from the bulb *g*, to the centre *d*, of the balance. *e*, are segments concentric with the centre *d*, and dividing the line representing the tube into equal parts, corresponding to the position of the mercury in equal increments of temperature. *f*, are lines, radiating from the centre, shewing the different inclination of each division of the tube to the radii of the balance. The progressional increase of motion in the column towards the centre, and, consequently, its effect on the moment of inertia of the balance, is shewn on the radius nearest the bulb, where it is crossed by the segments *e*.

The second improvement has reference to such time-keepers as are furnished with a pendulum,—the object sought being to remove the difference in the time of the pendulum's vibration between long and short arcs of oscillation. This is accomplished by adding a compensation, which increases its effect on the pendulum at the same accumulating rate as the increase in the length of the arc of vibration retards it, and thereby causes the long and short arcs to be performed in the same time. The mode of carrying out this improvement is shewn in front elevation at fig. 4, and in side elevation at fig. 5. *a*, is the pendulum-rod; *b*, is the compensating spring, supported by a clamp *c*, which is carried by a box *g*; and *d*, is a slide on the pendulum-rod, carrying the bar *e*, which is secured, in any required position, by the screw *f*. The box *g*, has a glass in front, for the purpose of protecting the spring *b*, from injury; and it is attached to a rod *h*, at the back, descending from the seat-board of the clock-case, and secured at any height by the binding-screw *i*. A pin *j*, projects from the bar *e*, which, as the pendulum vibrates, draws the spring into an elliptical form. When this improvement is employed in turret and other large clocks, the box containing the spring is secured to any convenient part of the clock or building.

The third part of the invention refers to an improvement in the mercurial pendulum, whereby the following objects are achieved: viz., firmness of construction and portability,—the necessity for removing the mercury from the mercury vessel being avoided; while, at the same time, the mercury is preserved from oxidation and dust. The improvement consists in packing the ends of the vessel containing the mercury, as shewn in sectional elevation at fig. 6, where *a*, is the pendulum-rod and *b*, a glass cylinder containing the mercury. *c, c,*

are stuffing-boxes, into which the plugs *d*, are screwed; *e*, is a regulating nut, working on the threaded end *f*, of the pendulum-rod; *g, g*, are small plugs, fitted with screws, cemented into the cylinder *b*,—their use being to afford facility for adding or removing mercury; *i, i*, is the packing; and *j*, the arc-scale, which is read off by a vernier *k*, attached to the pendulum-rod *a*.

The fourth improvement is intended to enable an ordinary-sized astronomical clock to regulate the movements of the largest turret clock without the intervention of electricity. The method of effecting this is shewn at figs. 7, 8, 9, and 10. Fig. 7, is an elevation, seen from the back, of the mechanism used in carrying out this improvement; and fig. 8, a side view of the same: in both of these figures the framework of the large wheels is omitted, to shew the other parts more distinctly. *a*, is the third wheel of the large clock train, which, together with the centre wheel and barrel, not exhibited, will not differ from the ordinary construction; *b*, is the fourth wheel, in the pinion of which *a*, acts; *c*, is a fly and pinion, driven by the wheel *b*, and provided with the usual click-work and means for altering the fans; and *d*, is a detent or arm, fixed upon the fourth wheel arbor, and resting against the fifth arbor, the bearing part of which is reduced to a semi-cylinder. The fifth wheel *e*, has a portion of its teeth removed, and one of its arms is furnished with a weight *f*, which is capable of adjustment thereon. The opposite end of the fifth wheel arbor to that against which the detent bears, passes through the case *g*, containing the small clock, shewn at fig. 8, and it is pivoted to the back plate thereof. This arbor carries a second detent *h*, which is forked at its bearing end, and rests against the escape-wheel arbor *i*, of the small clock, at the part where it is supported by the cock *j*. The arbor is reduced in two places to a semi-cylinder (in cross section), as shewn in the enlarged view, fig. 9. Fig. 10, is a view of the detent *h*, similarly enlarged, to shew the fork more plainly. The frames and pendulum are suspended from a bracket *k*, projecting from the clock-case. The back of the case and the bracket are composed of iron, cast in one piece: the other works of the small clock being of the ordinary construction, they are omitted here. The large barrel and centre-wheel arbors (which are not shewn in the drawing) may be made, as usual, much longer than the third and fourth arbors; and the case, containing the small clock, may be supported by fixing it against the frame containing the large wheels, or otherwise, as the building may necessitate.

The action of this arrangement of machinery will be as follows:—Once a minute, as the seconds hand of the small clock arrives at 60, one notch in the escape-arbor allows the detent *h*, to pass; which, being liberated, permits the weight *f*, to turn the fifth wheel, and so liberate the other detent *d*; and at the same time the teeth of the fifth wheel will fall into gear with those of the fourth wheel *b*. The detent *d*, being now free, the large train and hands will be set in motion by means of the pendent weights in connection therewith; and the motion will be regulated by the fly *c*. At the same time the fifth wheel *e*, will be driven round by the rotation of the wheel *b*; but when that part of the wheel *e*, which is devoid of teeth, comes opposite the wheel *b*, the weight *f*, will cause the wheel *e*, to fall out of gear with the wheel *b*, and the detent *h*, will rest against the escape-arbor as before. The large train will continue to move until the detent *d*, has made one revolution, and rests in its former position on the round part of the fourth arbor; and, during this time, the large hands will have moved forward over a space on the dial equal to one minute: they will then remain stationary until again released by the action of the small clock.

To prevent the detent *h*, when brought up again (by the rotation of the wheel *e*,) into contact with the arbor *i*, from falling on to the flat or notched part of the escape-arbor *i*, instead of the round part, it is forked as above stated, and has one prong set in advance of the other. The arbor *i*, is also provided with two notches at different parts of its circumference, to allow of the prongs escaping past the arbor in succession. When the second prong has passed its discharging notch in the escape-arbor, the detent *h*, will be free to move round and take up a position on the opposite side of the arbor *i*, as before. No pendulum or escapement is required for the large train,—the power of which is merely employed to drive the hands and let off the striking and quarters,—the time being entirely regulated by the small clock.

The fifth improvement consists in substituting a case, of the kind shewn in side elevation at fig. 11, for those generally employed for clocks. In this figure, *a*, is a bracket, made of any suitable material, but represented in the drawing as being composed of iron, cast in one piece. From this is suspended the clock, the pendulum, and the body of the case; the latter *b*, consisting, by preference, of a glass cylinder, with an hemispherical end (which will probably be the cheapest and most simple form, where the body is made entirely of glass), having an opening in it to allow of the regulation of the pen-

dulum. *c*, is a flanged ring of metal, or other material, cemented to the upper end of the cylinder, and employed for connecting the body of the case with the bracket, by means of screws or other fastenings. To afford facility for winding up the clock, without opening the case, a pinion is substituted for the ordinary key, which passes through the bracket from the outside, and acts in a contrite wheel, fixed on the front of the barrel. The pinion is arranged so that it can be thrown out of gear when not in use. This improvement is chiefly intended to protect the clock from rust, dust, &c.; and is more particularly adapted for observatories and other exposed situations; but, as the case can easily be rendered air-tight, it may be advantageously employed when experimenting on the vibration of pendulums in vacuo; and also when adjusting the compensation of pendulums for heat and cold. In the latter instance, the clock, enclosed in its case, is placed in a second cylinder over the other,—a space being left between them for water, to be heated by a lamp at the bottom.

The patentee claims, Firstly,—the application to the balance of bent tubes containing mercury or other fluid, for the purpose above set forth. Secondly,—the application of the compensation, above described, to pendulums, to meet the variations in the rate of the pendulum due to the increase and diminution in the arc of vibration. Thirdly,—the construction of mercurial pendulum, as above described. Fourthly,—regulating the action of turret or other large clocks by means of an astronomical or other small clock, brought into mechanical connection therewith; and particularly the detent arrangement, above described, for regulating the action of turret and other large clocks. And, Lastly,—the enclosing of clocks in the manner above described.

To John Bethell, *of Parliament-street, Gent., for improvements in machinery or apparatus for digging and cultivating land.*—[Sealed 3rd December, 1852.]

The machinery or apparatus which forms the subject of the present invention, is intended to be employed for excavating or cutting down hills for the formation of railways, and is also applicable, when suitably arranged, for digging or cultivating land for agricultural purposes. The apparatus consists, principally, of a rotary digger, which is adapted to a steam-engine, of the kind usually employed for agricultural purposes. The rotary digger consists of a drum or shaft, round which are

arranged, in a helical direction, a number of prongs or tines. This digger turns in bearings made at the end of a frame, or a pair of lever arms, secured to either the front or back part of the carriage, in such a manner that it may be raised or lowered, as may be required; there is also a set-screw, or other suitable and convenient contrivance, for holding up or supporting the frame and digger, at any given point, while in operation. On one end of the digger-shaft or drum is mounted a rigger or pulley, to which motion is communicated by means of a band or strap, passing from another rigger on the crank-shaft, and actuated by the engine.

When the machine is to be employed simply for digging or excavating, such as cutting down a hill for the formation of a railway, the digger is placed in front, and is pushed forward up to the hill or bank, either by mechanical means or in any other suitable manner; and the rotary cutter being made to operate against the hill or bank, will cut down the earth, and throw it under the carriage; and from thence it can be removed, either by a chain of buckets or by hand labor, and deposited in trucks or carts for removal to a distance. When the machine is required for digging or cultivating land or level ground, the rotary digger is placed behind, and so arranged that it may be lowered on to the ground; and, upon rotary motion being communicated to it, the tines will cut away the ground and throw it backward. While the machine is in operation it is drawn slowly over the land by horse or other power; and, by that means, the digger will be continually operating on fresh ground, and the earth, when thrown backwards, will be deposited in a finely-divided state, and in an even and regular manner.

In Plate IV., fig. 1, represents the arrangement for digging or excavating land for the formation of railways; and figs. 2, and 3, represent a machine adapted for digging or cultivating land for agricultural purposes. Fig. 1, is a side elevation of the machinery or apparatus, as adapted for digging or excavating land for the formation of a railway. *a, a,* is the boiler and engine, whereby the machine or digging apparatus is actuated.* This prime mover, together with all the other apparatus, is mounted on wheels, for the facility of moving it from place to place. *b, b,* is an arm or lever frame, one at each side of the machine, and at the outer end of which the rotary digger *c,* is mounted in suitable bearings. The arm or frame *b,* is mounted on the crank-shaft *d,* and is moveable thereon in a vertical direction. Rotary motion is communicated to the digger *c,* from the crank-shaft *d,* by means of a band, which passes

from the pulley or band-wheel *e*, on the shaft *d*. Around the pulley *f*, on the shaft of the digger *c*, sector-racks *g*, *g*, are keyed or cast on to or otherwise firmly secured to the boss of the digger-frame or arms *b*, *b*. In the teeth of these sector-racks *g*, *g*, the toothed pinions *h*, gear on the ends of the horizontal shaft *i*. A bevil-wheel is keyed on to this shaft *i*, and is driven by a similar bevil-wheel *k*, on the end of the long shaft *l*, which is furnished at the opposite end with handles, whereby the shaft may be turned. It will now be seen that the altitude or angle of the arms or frame *b*, *b*, and consequently the position of the digger, may be varied at pleasure, by simply turning the shaft *l*, by means of the handles at the end thereof; and therefore, as rapid rotary motion can be communicated to the digger by the gearing above described, the digger will, when brought into contact with a bank of earth, rapidly cut away the earth, and throw it down. This operation is much facilitated by placing the digger or cutting tool at the end of a lever-frame or arms, which will admit of the digger being raised or lowered as the digging operation proceeds. The surface of the ground, on which the machine stands, should be levelled as the digging proceeds. The earth, as it is cut away from the bank by the digger, falls on to a rotating disc *m*, which is fixed on to the lower end of the vertical shaft *n*, and is actuated by the toothed gearing *o*, *o*. From this rotating disc *m*, the earth is raised by the endless chain of travelling scoops *p*, *p*, which act in a similar manner to the scoops of a dredging-machine, and convey the earth into waggons or receptacles placed behind the machine. This endless chain of scoops is actuated by a band *q*, which passes from the pulley or band-wheel *e*, on the crank-shaft, and around another band-wheel *q**, at the opposite end of the machine. When the digger has cut away sufficient of the bank to admit of the machine being moved forward, to continue its operations, this object is effected by means of the handles on the upper edge of the vertical shaft *r*, shewn by dots in fig. 1. This shaft *r*, carries at its lower end an endless screw *t*, which gears into and drives the toothed wheel *s*, on the axle of the hindermost running-wheel *u*, as shewn at fig. 1; and, as all the running wheels are connected together by the rods *v*, *v*, it follows, that if a slow motion is communicated to the hindermost wheel by means of the screw-shaft *r*, that the whole machine will be caused to move slowly forward towards the bank, and the digger may therefore be always kept to its work.

Fig. 2, is a side elevation, and fig. 3, a plan view of a

machine for digging or cultivating land, constructed upon the same principle as the machine just described. As, however, the only operation that is required for this purpose is to dig, loosen, or disintegrate the surface of the soil or earth, the endless chain of buckets or scoops is dispensed with; and the digger is, in this instance, placed behind instead of in front of the machine, which is mounted on four wheels, and is intended to be drawn forward by horses. *a, a,* represents the boiler and engine; and *b, b,* the lever arms or frames, at the outer ends of which the digger *c, c,* is mounted. Motion is communicated from the engine to the crank-shaft *d,* on which is keyed the rigger or band-wheel *e,* from whence a band or strap passes round another band-wheel *f,* on the axle of the lever-arms *b, b.* Rotary motion is, by means of a band or strap, communicated from the band-wheel *f,* at one end of the lever-arms *b,* to a similar band-wheel *f**, on the axle of the digger *c,* at the opposite end. The depth to which the prongs or tines of the digger are made to enter the ground is regulated by raising or lowering the screw-shaft *r,* by means of the winch or handle at its upper end, as shewn in fig. 2.

The patentee claims first, the general combination and arrangements herein shewn and described, or any mere modification thereof, when employed for similar purposes. Secondly,—he claims, particularly, the use and application of a rotary digger at the end of a lever-arm or frame, so arranged that the rotary digger may be raised up in a vertical direction, and may be enabled to cut or dig away the face of a hill or bank for a considerable extent in a vertical direction; he also claims the use and application, for digging or cultivating land, of a rotary digger, as above described, when worked by steam power.

To Ephraim Mosely, *of Grosvenor-street, dentist, for improvements in the manufacture of artificial masticating apparatus.*—[Sealed 21st December, 1852.]

The object of this invention is to provide the mouth with an artificial masticating apparatus, which, by yielding slightly to the pressure of the jaws, will avoid the unpleasant jar in the mouth which is experienced by persons using the ordinary construction of artificial masticating apparatus. In carrying out this invention, the patentee affixes to that surface of the ordinary gold plate or frame, which has heretofore been brought into contact with the gum, a layer of wire gauze, for the purpose of receiving a coating of India-rubber, which is

to form an elastic cushion, and yield sufficiently to the pressure of the gums to prevent the occurrence of the unpleasant jarring sensation above alluded to.

In Plate V., fig. 1, shews, in plan view, and fig. 2, in cross section (taken in the line 1, 2, of fig. 1), a gold plate, carrying teeth on its under surface, and provided with a yielding substance, to receive the pressure of the gum of the upper jaw. *a, a,* is the ordinary gold plate, moulded to suit the mouth of the patient, and carrying artificial teeth *b,* which are rivetted or soldered thereto in the usual way. To the upper surface of the gold plate a layer of platinum wire gauze *c,* (in part exhibited at fig. 1), is attached. This wire gauze is used for the purpose of presenting a good holding surface to the cement employed in fixing the layer of India-rubber *d,* to the plate *a,* which India-rubber is intended to cover the whole of the metal surface that would, in its absence, be brought into contact with the gum. It will be understood that the India-rubber is shewn deficient in fig. 1, for the purpose of exposing part of the metal plate and interposed wire gauze to view.

In some cases it may be thought desirable to form on the gold plate an artificial gum, so that the teeth may appear to be imbedded as in nature. When this is required, a suitably-moulded perforated plate, or wire gauze frame, composed of platinum, or other non-oxidizable metal, is affixed to the gold plate *a,* and this plate or frame is covered with a preparation of India-rubber, of the color of the natural gum; the adherence of the India-rubber to the metal being effected by means of suitable cement; and thus an effect may be obtained closely resembling the setting of the teeth in the natural gums. Or the patentee uses a colored solution of India-rubber, and applies it, by means of a camel's-hair brush, to the metal gum,—laying coat upon coat until a sufficient thickness is obtained. This solution, as well as the preparation of colored India-rubber above mentioned, is produced by dissolving the India-rubber in chloroform, and mixing vermillion therewith.

When economy is an object, instead of the plan above set forth, the patentee applies the coating of India-rubber to a bone frame, without the intervention of wire gauze. In such case, the mode of fastening shewn at figs. 3, and 4, is adopted; in which fig. 3, is a plan view, and fig. 4, a cross section of a bone frame, thus fitted. In these figures, *e, e,* are small plates of gold, set at convenient distances apart, and made to press upon the layer of India-rubber *d,* by means of gold pins passing through them, and entering the bone frame; and by this means the India-rubber cushion, or covering, is secured in its place.

The patentee claims,—First, interposing between the gum of the wearer of artificial teeth, and the plate or frame which carries the teeth, a layer or cushion of India-rubber, for the purpose above set forth; and, Secondly,—the mode above described, of producing artificial gums, having the appearance of the natural gum.

To William Pink, *of Fareham, in the county of Hants, saddler, for an improved construction of stirrup-bar for saddles.*—[Sealed 29th November, 1852.]

This invention refers to a novel construction of bar for supporting the stirrup-leather; the object being, to permit of the disengagement of the stirrup-leather from the bar, in case the rider is thrown from his horse, with one foot still remaining in a stirrup, and thereby to prevent the possibility of the rider being dragged along the ground by his horse. Instead of using a fixed bar, standing out at right angles from the stirrup-leather bar plate, and forming one piece therewith, a shoulder is formed on the plate, which is rivetted to the saddle-tree, and attaches the bar thereto by a fulcrum-pin; thus forming a kind of hinge joint, which will admit of the bar moving upwards, but will not allow of its moving below the proper line for retaining the stirrup-leather upon it. The shoulder which stands out from the plate is so formed, that it will cause the bar, as it rises on its hinge joint, to move also obliquely, or further from the plate, and thus prevent the possibility of the stirrup-leather being jammed between the plate and the bar. At the end of this bar there is a stop-piece, as usual, which is capable of turning on its fulcrum-pin, but is kept in its retaining position by a spring lever attached to the bar, and bearing against the lower flattened edge of the stop. This spring lever is capable of rocking on its supporting pin; but when the bar is in position, a stud-pin, projecting from the strap bar-plate, abuts against the inner or rear end of the lever, and thereby causes the opposite end of the lever to bear tightly against the stop. In case a rider, using this construction of bar, should be thrown across the saddle, and get one of his feet entangled in a stirrup, the upward drag of the stirrup-leather will cause the bar to rise on its fulcrum-pin, and thereby release the spring lever, which keeps the stop in position, from the pressure of the projecting stud: the stop will then give way to the drag of the stirrup-leather, and allow the same to slide off laterally, and disengage the dismounted rider from the saddle.

In Plate IV., fig. 1, shews the saddle-bar, and plate to which it is jointed; fig. 2, is an edge view thereof; and fig. 3, is a view, shewing the saddle-bar in its elevated position. *a*, *a*, is the stirrup bar-plate, formed with a raised part or shoulder *a**, (see fig. 2), from which projects a pin *b*, that forms the fulcrum for the stirrup-bar *c*. The shoulder *a**, acts as an abutting piece, against which the inner end of the bar *c*, bears, when it is in the proper position for carrying the stirrup-leather. Projecting from the shoulder *a**, is a stud-pin *d*, which, when the bar *c*, is in position, bears against the rear end of the spring lever *e*, carried by the bar, and prevents the spring lever yielding to any slight pressure that may be put upon its other end. By this means, therefore, the ordinary yielding stop *f*, at the outer extremity of the stirrup-bar, is retained in its erect position, and the stirrup-strap is prevented from sliding off its bearings. But in case the rider is thrown from his horse, and one of his feet is retained in a stirrup, the drag of the strap will cause the bar *c*, to rise to the position shewn at fig. 3; the spring lever *e*, being now moved out of contact with the stud-pin *d*, will no longer present any resistance to the movement of the stop *f*; and if, therefore, it is pressed upon by the stirrup-leather, it will readily yield, and allow of the strap sliding off the bar, and effecting the disengagement of the stirrup from the saddle.

It will be seen by inspecting the edge view, fig. 2, that the bar is set at an angle to the plane of the plate *a*; this is for the purpose of increasing the distance between the under surface of the bar and the plate which carries it, and preventing, as before stated, the possibility of the stirrup-leather being jammed between the plate and the bar.

The patentee claims, the general arrangement and construction of saddle-bar, as above set forth.

To FREDERIC NEWTON, *of Fleet-street, optician, for improvements in apparatus to be employed for producing photographic pictures.*—[Sealed 2nd October, 1852.]

THIS invention relates to an improved arrangement of apparatus for taking photographic pictures without the use of a dark room; the essential feature of the invention consisting in so constructing a camera, and the apparatus to be used therewith, that the surface upon which the picture is to be formed may be subjected to the various treatments necessary to render the surface sensitive, and to develope and, if neces-

sary, fix the picture, without the necessity of handling the plate or surface, or introducing the hands of the operator into the camera, or other part of the apparatus.

One method of accomplishing this object, is by suspending the glass plate or other surface over a long slot or aperture made in the bottom of the camera, for the introduction from below of the vessels containing the requisite chemical solutions. The plate or other surface having been properly coated with collodion, or other suitable material, is secured in a clip, or holder, fixed to, or suspended from, the upper part of the camera. The vessel containing the nitrate of silver is carefully passed up from below through the slotted bottom of the camera, and the plate is allowed to remain in the solution a sufficient length of time to be properly coated by the silver solution; after which the vessel is drawn down through the bottom of the camera, and the aperture is carefully closed by a slide, to exclude the light. The picture may then be taken in the ordinary way on the sensitive surface; and, when this is effected, the plate is immersed in the developing solution, by passing a vessel, containing such solution, through the slotted bottom of the camera. Vessels containing water for washing the surface, and also a solution for fixing the picture, are in like manner introduced from below; care being taken to close the opening by means of a slide, or other convenient contrivance, whenever a change of the vessels is required to be made.

Instead of introducing the vessels from below, and drawing them down out of the camera when done with, the vessels may be suspended under the opening in the bottom of the camera, by making them slide into grooves made for the purpose. The plate or other surface being suspended from a clip attached to a moveable rod, may then be easily dipped down into the several vessels which may be placed in turn beneath the camera. The clip-holder should, if made of brass, be well plated with silver, or strongly gilt; or, if preferred, it may be made of bone or ivory; and being attached to one end of a rod, which passes through a stuffing-box at the top of the camera, the plate may be easily lowered into, and raised out of, the chemical solutions contained in the troughs situate beneath the camera, by merely pushing down the suspending rod. Instead of placing the troughs or vessels containing the chemical solutions under the camera in turn, and removing them therefrom separately, it will be found convenient in practice to adapt to the under side of the camera a drawer or box, in which vessels containing all the requisite

chemical solutions may be placed. In this arrangement, the box must be made to slide backwards and forwards in grooves, made under, or attached to, the under side of the camera; so that the several vessels may in turn be brought beneath the plate, which is to be slidden down in the manner already described, and immersed in the chemical agents. To facilitate this operation, a tail-piece is attached to the box which carries the troughs or vessels, and on this tail-piece is marked the distances to which the box must be slidden, in order to bring the several solutions beneath the pendent plate.

A modification of this plan may be made by placing the box inside the camera; in which case, when it is required to shift the plate from one trough to another, the plate must be drawn up into a chamber fixed above the body of the camera: the box containing the troughs may then be pushed forward.

This modification is shewn in Plate V., at figs. 1, and 2; in which fig. 1, is a longitudinal vertical section of the improved camera, and fig. 2, is an end view thereof. *a, a,* is the body of the camera, and *b, b,* is the drawer or box which contains the solution troughs *d, d, d,* and slides in grooves made inside the camera. *c, c,* is a chamber, secured to the top of the camera, immediately above a slot or opening extending right across the camera. This chamber is supported by side pieces *c**; and when the camera is not in use, it may be removed altogether, for the convenience of packing. The chamber *c,* is provided with a sliding front *e,* which may be taken out when the plate is required to be placed in, or removed from, the camera. The glass plate or surface *f,* on which the picture is to be taken, is secured by a screw in a clip *g,* attached to the lower end of the rod *h,* which passes through the stuffing-box *i,* above. For the purpose of enabling the operator to bring the several troughs or solution vessels with accuracy beneath the plate *f,* the box *b,* which contains the vessels *d, d,* is provided with a projecting tail-piece *b*,* on which is marked the several distances to which the box must be moved, in order to bring the solution troughs beneath the plate. For the convenience of examining the surface of the plate *f,* or observing the development of the picture at any time while in the camera, the chamber *c, c,* is provided with a yellow glass window *j,* which is covered up by a shutter *k,* when not in use. Fig. 3, is a longitudinal vertical section of another modification, in which the chemical solutions are contained in troughs, placed in a box, which is suspended from beneath the camera instead of inside. In this instance, the box or drawer containing the troughs *d, d,* is not intended to be

moved backwards or forwards, for the purpose of bringing the several troughs *d*, under the plate in succession, but is always stationary; and the plate is made moveable backward and forward instead of the box, by mounting the stuffing-box *i*, through which the suspending rod *h*, passes, to a moveable bar *l*. This bar is made capable of sliding in guides *m*, *m*, which are screwed, or otherwise firmly fixed, on the top of the camera, and are shewn detached, and upon an enlarged scale, in side and end elevation, at figs. 4, and 5. In order that the operator may be able to bring the plate immediately over the several troughs in the box below, certain marks are made on the guide-plates *m*, *m*; and when an index marked on the moveable plate *l*, is brought into coincidence with either of the marks on the fixed guides, the operator will at once know that the plate is above a certain trough: it will then only be necessary to push down the rod, and the plate will be dipped into, and be acted on by, the solution. In order further to ensure the plate's descent in a line perfectly parallel with the troughs *d*, *d*, a groove is made all down the rod *h*; and the end of a screw *n*, which passes through the collar of the stuffing-box *i*, enters this groove, and prevents the bar from turning round. The patentee remarks, that it will be found convenient to arrange the apparatus in such a manner, that the first trough, containing the silver solution, will stand under that part of the camera where the plate *f*, is placed for a short focus lens or lenses, and the last trough will stand in a position corresponding to the longer focus of another lens or lenses. In order to obtain a proper focus, a piece of ground glass is placed in the clamp *g*; and the sliding-bar *l*, is moved so as to bring the index-point *q*, on the sliding-bar *l*, coincident with the mark on the fixed guides *m*, corresponding to the long or short focus, as the case may be. The bar *l*, is then to be clamped there, by means of the clamp-screw *o*, and securely held until the exact focus (that obtained by the index being merely an approximation) has been obtained by the ordinary rack, or sliding motion, in front, but not shewn in the drawing. The bar *l*, may then be unclamped, and moved backwards or forwards, as may be required, but can always be brought back with accuracy to the original spot. To enable the operator to examine the development of the picture in the construction of camera just described, an eye-hole may, if required, be made in some convenient part of the camera, and light may be admitted to the interior through a window at the top. This window must be glazed with glass of a suitable color, so that the light that is admitted may not affect the picture while

under the action of the chemical solutions; and the window should also be provided with a shutter, to exclude the light while the picture is being taken.

It will be understood, that a picture upon a surface of any size, within the limits of the camera, may be taken, without the necessity of separate frames,—the ground glass being marked, as is now usual, in order to shew the extent of view that will appear upon a certain size; and, by raising or lowering the rod *h*, from which the surface is suspended, the relative amount of foreground and sky may be determined; care being taken to restore the rod *h*, and plate *f*, to the focussed elevation, and to retain the rod *h*, there, by the screw *n*, when the picture is to be taken.

It will likewise be understood, that if the troughs are made moveable, the necessity for making the plate or picture surface moveable horizontally, will not exist.

If lenses of different foci are intended to be employed in the same camera, then a hole or opening, corresponding to each focus, must be made in the top of the camera, for the purpose of receiving the stuffing-box through which the suspending rod passes.

At figs. 6, and 7, a modification of the camera is shewn, in which the solution troughs are detached from the camera, and are contained in a separate box. Fig. 6, is a longitudinal vertical section of the camera, and fig. 7, is a sectional view of the box containing the solution troughs *d, d*. The plate *f*, is suspended, by means of a clip, from a rod, and is enclosed in a moveable box or chamber *c, c*,—the rod *h*, passing through a stuffing-box *i*, at the top of the moveable chamber *c*. But instead of this box or chamber *c*, being placed on the top of the camera, it is introduced either from above or from below; a long slot or opening being made, in either case, in the camera, to allow the box to be introduced. Now, supposing the plate *f*, has been made sensitive by means of a silver bath, and the moveable chamber *c*, has been introduced into the camera, the shutter *e*, must be drawn up, so as to expose the sensitive surface of the plate *f*, to the light from the lens; and when the picture has been taken, the shutter *e*, must be lowered, so as to make the chamber quite dark. The chamber may then be removed from the camera, and fixed on the top of the box *b, b*, above a long slot or opening b^1, made in the lid thereof. The troughs or vessels *d, d*, containing the chemical solutions, are then brought successively under the plate *f*, by pushing forward the tail-piece b^*; and the bottom of the chamber *c*,

being opened by the withdrawal of a sliding-piece *p*, the plate may be moved down into the solutions by means of the sliding-rod *h*, as in the other cases.

At fig. 7, a mode of avoiding the necessity of carrying separate bottles for the solutions is shewn. Each of the troughs is provided with a stopper *s*, *s*, made of wood, covered with vulcanized caoutchouc, or other suitable elastic substance; and these stoppers are kept in their places by the lid of the box. It is evident that the same arrangement for stopping the troughs may be adapted to the other plans above described, in which the box or drawer containing the troughs is adapted to the camera; and by this means much room is economized in the camera, and the weight of the apparatus, complete for working, is thereby very materially diminished.

The patentee claims the general arrangement or construction of photographic cameras, as above described, or any mere modification thereof, whereby the plate or surface on which the picture is intended to be produced, may be subjected to the operation of the chemical solutions or agents in the camera itself, or in another apparatus or box, which may or may not be connected with, or attached to, the camera; the essential feature of novelty being, that the various operations of dipping or introducing the plate or surface into the solutions or chemical agents, or withdrawing it therefrom, may be effected without handling the plate or surface itself, or introducing the hands into the camera. He claims, particularly, suspending the plate or surface, in any convenient manner, from a rod, which is capable of moving up and down in a stuffing-box, or through a hole or aperture made in the camera, so that the plate or surface may be lowered into, and raised out of, the troughs *d*, or vessels containing the chemical agents, without handling the same. Also, placing the troughs or vessels, containing the chemical agents, in a box or drawer, which may either be placed inside the camera, or made to run in grooves on or attached to the under side of the camera, or used detached therefrom, as above described. And, lastly, the method, herein shewn and described, or any mere modification thereof, for stopping the troughs *d*, *d*, so as to dispense with the use of separate bottles or vessels for carrying the chemical solutions.

To Alfred Vincent Newton, *of the Office for Patents*, 66, *Chancery-lane, mechanical draughtsman, for improvements in the means of urging the fires and increasing the draft of furnaces, and in arresting the sparks given off from the chimneys of locomotive engines,—being a communication.* —[Sealed 22nd December, 1852.]

This invention relates, firstly, to an improved construction of spark-arrester, which is provided with a draft-flue for taking in currents of air direct from the atmosphere and passing them upwards, for the purpose of aiding the draft of the chimney, which becomes impeded by the means employed for separating the sparks from the other products of combustion. The invention also relates to the adaptation to a locomotive chimney of an apparatus, the purpose of which is to urge the fires without the necessity of employing exhaust steam for the purpose,

In Plate V., fig. 1, is a vertical section of a chimney, with the spark-arrester attached; fig. 2, is a vertical section of a modified arrangement for promoting the draft of the fire; fig. 3, is a plan of the same; and fig. 4, is a view of the spark-arrester with the jackets B^1, and C^1, removed, to shew the wings *a*. A, fig. 1, represents the outer shell or case of the spark-arrester; through the centre of which passes the chimney B, extending up a short distance into the chamber C, which may be cylindrical, having a closed top D, of conical form, and the bottom open. In the shell of the chamber C, are arranged a series of openings E, F, G;—the upper series E, is covered with fine wire-gauze netting; the second series F, is covered with a coarser netting of similar material; and the third series G, is entirely open. Thus the smoke, steam, and other gases may, as they are thrown downward by the conical cap or top D, against the sides of the cylinder C, pass through the gauze-covered openings E, F, which are graduated, so as to increase the openings as the draft is diminished, until the openings G, which are without any netting, allow the remaining products of combustion to pass through unobstructed. The sparks, cinders, &c., after passing through the openings F, will drop into the spark-receptacle H; there not being sufficient draft to draw them through the openings G, except, perhaps, the very lightest of them. If, however, they should be drawn through the openings G, the ascending draft outside, and between the cylinder

C, and the shell of the spark-chamber, would not be sufficient to carry them up and out of the exit J; and, furthermore, to guard against such consequences, a gauze netting I, is placed between the chamber C, and the shell of the spark-chamber H, which effectually prevents any such contingency; and the sparks consequently fall from the outside as well as from the inside of the cylinder C, into the spark receptacle H,—the communication with it being from both sides of the cylinder. The lighter portions of the sparks and gases find their way out through the openings E, and F, to the exit J; whilst the heavier portions drop down into the receptacle H; from whence they can be removed through the opening K. The openings may be varied in size and number to suit the circumstances of the case; and there may be three or more tiers of openings, graduated from fine gauze nettings to unobstructed openings,—leaving sufficient solid surface, against which the sparks may strike to deaden them, and give them a downward tendency. L, represents the stay-rods, for bracing the top of the chimney.

Outside the spark receptacle, or that part which generally constitutes the outer shell of the stack, another shell A, is arranged at such a distance as to form between them an air-flue R, for aiding the draft of the chimney, which has been impeded by the separation of the sparks, &c. This air-flue has an opening or openings at the bottom of the stack, and may have a flaring mouth S, in front, to catch in the air or draft created by the velocity of the locomotive or steam-boat to which it may be attached; which air, after it passes in, becomes highly heated by the heat of the interior of the stack, and ascends with great rapidity; thus creating another stronger draft to aid the natural draft of the chimney. The escape steam may be let into the chimney, as now done; or it may pass into the air-flue, as may be found most expedient; and the air-flue may be divided into two or more flues. T, are braces, to aid in supporting the stack. Over the top of the stack may be placed a cap M, the flange N, of which may project downward to any suitable distanee, leaving an open space all around the stack, except in the rear, where a portion of the said opening, when the stack is used on any thing in motion, should be closed, to prevent the air from being drawn backward by the eddy in rear of the stack. Through this opening also some additional draft to the chimney may be procured by drawing in a current to aid the others passing up from the bottom of the stack. The cap M, may be secured to the outer case by hinges O, and a clasp P, so that it may

be raised to clean out the chambers or nettings, or for repairs, if found necessary.

A modification of the above is shewn at figs. 2, 3, and 4; and also the apparatus for urging the locomotive fire. A, figs. 2, 3, and 4, is the exterior shell of the spark-arrester; to the outside of which are attached wings *a*, which start from the point a^1, as shewn in fig. 3, and run in a curve down each side of the shell A, to the point a^2, as represented in fig. 4. Outside of these wings, and at a distance of four to six inches, more or less, from the shell, is placed the jacket B^1, extending a little more than half round the chimney to the points b^1. (see fig. 3.) The wings *a*, form a tight bottom to the chamber or space between the shell A, and the jacket B; and the air which enters this space at the opening *x*, in front, as the locomotive advances, is guided by the wings *a*, to the top of the stack, where it is forced out in the direction indicated by the arrow *z*, in fig. 2, and materially aids the draft of the chimney and spark-arrester, by the partial vacuum formed over them. A flange *f*, extends round the front half of the shell A, figs. 2, 3, and 4, for the purpose of preventing the air, which impinges upon the front of the chimney as the locomotive advances, from impeding the upward draft within, and also to assist in directing such air into the space above the wings. This flange projects four to six inches, more or less, from the top of the chimney, and extends as far back as may be necessary to accomplish the desired end. Outside one jacket B^1, is another C^1, (figs. 2, and 3,) also extending from one-half to two-thirds round the chimney. The space between the two jackets B^1, and C^1, is closed at top and bottom (c, c^1, fig. 2,) and is open in front, where it is made more or less flaring, as seen at *d*, fig. 3, for the purpose of gathering the air, which is compressed in the space between the jackets B^1, and C^1, when the locomotive is in motion, and forced through the funnel-shaped conductor *g*, and branch-pipes connected therewith to the fire, for the purpose of urging the same. These devices are applicable to locomotive engines, either with or without the spark-arrester, and to the chimneys of steam-boats; and also, either with or without the spark-arrester, to the stationary chimneys of furnaces or manufactories. It is also proposed to apply a register to the pipes carrying the blast to the fire, that a uniform blast may be obtained.

The patentee claims, First,—the general arrangement and construction of spark-arrester, as shewn and described, with reference to fig. 1. Secondly,—combining with a stack or

chimney, provided with chambers and openings for separating and passing out the smoke and gases and retaining the sparks, the draft-flue around the stack, which takes in air at the bottom, and furnishes, at the top of the chimney, additional draft to supply that impeded by the separation of the sparks, when arranged as herein set forth. Thirdly,—the auxiliary apparatus, for the purpose of aiding the current in the draft-flue, consisting of the wings *a*, and jacket B^1, or their equivalents, arranged and operating in manner above described. And, Fourthly,—the jacket C^1, and branch pipes connected therewith, or their equivalents, for the purpose above described.

To JOHN LEE STEVENS, *of Kennington, in the county of Surrey, for improvements in furnaces.*—[Sealed 1st October, 1852.

THIS invention relates to double furnaces, where the product from the fuel on one set of fire-bars passes over or through the bright fire on the other set of fire-bars, which has heretofore been proposed to be accomplished in various ways. The improvements consist in applying the second fire-bars above the first, in such a manner, that the bridge at the back end is common to the two sets of fire-bars, and the fuel may be fed on to the two sets of bars through the one fire-door.

The object of these improvements is to obtain the more complete combustion of the products of the fuel, as well as to prevent or lessen the formation of smoke.

In Plate IV., is shewn a longitudinal section of a furnace applied to a steam-boiler, arranged according to this invention. In this figure, *a*, is an air passage; *b*, the doorway to the second or upper furnace, from the fire-bars of which, ignited fuel falls on to the first or lower set of fire-bars *c*, nearest the floor. The second or upper set of fire-bars *d*, are constructed with one, two, or more ranges, according to the length of the furnace. The fuel from the second set of fire-bars falls through an aperture *e*, on to the first set of fire-bars, from which the products of the fuel pass up between a plate *f*, and the bridge *g*, which serves for both sets of fire-bars, and mix with the products from and over the second set of fire-bars. In large furnaces, or those used for marine or other purposes, where the fire is kept up continuously for many hours, the front of the plate *f*, is protected with fire-bricks, supported by a bar about four inches above the ends of the fire-bars *d*. It will be seen, that whilst the first set of fire-bars *c*, is supplied with fuel over

and through the second set of fire-bars *d*, the current of air *h*, is accumulating heat and velocity in a rapidly increasing ratio (in consequence of its passing between two strata of fire, as well as between the plate *f*, and the bridge *g*, which are naturally heated by the action of both fires), and that it carries up and mixes with the products from the fires at *c*, and *d*; whereby the utmost attainable combustion is effected, and the formation of smoke is most materially lessened, if not entirely prevented.

The patentee claims the mode of combining and arranging fire-bars, and the manner of supplying the first set with fuel; thereby causing the products of the fuel of the two furnaces to be mixed and better consumed, as above described.

To JOHN FINLAY, *of Glasgow, North Britain, for improvements in grates and fire-places, or apparatus for generating heat.*—[Sealed 1st October, 1852.]

THIS invention relates to various improvements in fire-grates, for obtaining increased efficiency of draught, together with a better radiation of heat, the accurate and easy adjustment of the regulating apparatus, a modification of the draught, the proper combustion of fuel, and the consumption of smoke; and consist in applying a single overhanging draught door at the back of a fire-grate (suitable for dwelling-houses), and hinged at its bottom. This door is so contrived, that when fully open, to allow of the greatest extent of air passing to the chimney, it leans or inclines backwards from its bottom joint towards the chimney or wall, in which the grate is placed; and when the door is shut, so as to cut off all communication with the flue or chimney, its upper edge inclines forwards towards the room. This door is so adapted, as to allow the smoke and heated air to pass off from the fire-place by the upper portion of the door; and it also furnishes a means of back draught, or a secondary air passage, at a lower level; by which means any thick green smoke from a fresh lighted fire is at once conveyed off from the level of the surface of the coal in the grate to the flue, by a short route, so as to keep the fuel clear of smoke, to aid the draught, and prevent the chance of such thick heavy smoke getting into the apartment in which the fire-grate is placed. This back draught is obtained by hinging the lower edge of the door to the fixed portion of the back of the grate, at or near the level of the surface of the burning fuel, by means of a horizontal joint or centre pin; beyond which joint pin the lower edge of the door is slightly prolonged, so as to

form a secondary regulating door or valve. The door thus becomes a double lever; the upper side or main portion being arranged to close by moving forward; whilst the lower edge beneath the joint similarly closes its narrower passage by the consequent backward motion. Whatever dense smoke escapes through the lower opening into the flue, passes behind the main portion of the door; and any heated gases or air so passing, produce a radiant heat, by acting on the door from behind. This duplex arrangement of door thus opens and closes both passages simultaneously, and any regulation of the main door must correspondingly adjust the lower back draught. The adjustment of the draught door may be effected in various ways; either by a notched catch-rod hinged to the door, and so contrived as to be available either from the front of the door or side of the grate—the notches working over a fixed stop behind the grate—or, instead of this arrangement, the adjusting rod or lever may be formed with an undulating edge, or rounded notches, so that a weight hung on the end of the lever, or a spring, either fixed to the lever itself or detached, may hold the door at any required undulation. By this plan, mere pressure on the door will adjust it either way without attending to the lever or catch-rod. Or, instead of this plan, the door may be set on an adjustable friction-joint centre, so as to give any required degree of frictional hold to retain the door at any angle at which it may be set. Frictional side pressure, by a spring, may also be used to attain the same end, so as to give a noiseless plan of adjustment.

In Plate IV., fig. 1, represents a transverse vertical section of a domestic fire-grate, shewing the door full open, and the main draught current passing off in the direction of the arrow *e*, in front of the door to the chimney; whilst the back draught, or secondary current, passes through the smaller aperture *f*, and also escapes to the chimney, along the space *g*, between the back of the draught door and the front of the stationary inclined back plate *h*. To the upper edge of this back plate is fastened a hinge-piece *i*, to which is loosely jointed the rod or link, formed with undulating notches on its lower edge. This link projects forward, and rests upon the upper edge of the door; so that when the latter is drawn forward by the projection *k*, to the position indicated by the dotted lines *l*, the loose end of the link bears upon and retains the door at any desired angle. The dotted lines *l*, shewing the door, also represent the mode in which any change in its position correspondingly affects the back or secondary draught aperture.

In this way the domestic may easily adjust the door to any desired extent of opening; as a slight pressure in either direction will cause its upper edge to slip along the detent undulations to the required position. Fig. 2, is a view, shewing, on a larger scale, the details of the hinge of the draught door. The overhanging door *a*, is in this case hinged at *b*, by a pair of side pivots, which rest in recesses in a hinge support *c*, one on each side of the grate; and *d*, is the prolongation of the door below the joint or centre of suspension.

The patentee claims, First,—the application and use of an overhanging back door, for obtaining two separate vents or passages for the products of combustion. Secondly,—the system or mode of arranging and constructing fire-grates and fire-places, wherein the front or main draught, and the back or secondary draught, are simultaneously adjusted and regulated. Thirdly,—the system or mode of carrying off the dense smoke and vapours of fuel, by a back or secondary draught, as hereinbefore described. And, Fourthly,—the application and use of a detent link or holder, with undulating notches or holding surfaces, acting in both directions, by the use of lateral or simple pressure only, as hereinbefore described.

To JOHN MACMILLAN DUNLOP, *of Manchester, engineer, for improvements in the manufacture of wheels for carriages.*—[Sealed 1st October, 1852.]

THIS invention consists in manufacturing the tyres of carriage-wheels of decarbonized or annealed cast-iron, into which rings of vulcanized or other compounds of India-rubber are inserted.

In Plate IV., fig. 1, is a front view of a wheel constructed according to this invention; fig. 2, is an end view; and fig. 3, is a section of a portion of the tyre, shewn on a larger scale. *a*, is the tyre, made of decarbonized or softened cast-iron, and cast with a groove, to admit the ring of vulcanized (or any other compound of) India-rubber *b*. This India-rubber ring is kept in its place by the pins *c*, passing through and projecting beyond it, and entering into the recessed part of the groove in the tyre, as shewn at fig. 3. The patentee remarks, that the tyres may either be cast separate, as shewn, and put on to the wooden felloes of the wheel, in the usual manner, or the tyre may be cast with the nave and spokes, if the same should be found preferable. He also states, that he lays no claim to the employment of India-rubber rings as tyres for

wheels; but he claims the combination of rings, made of vulcanized or any other compound of India-rubber, with decarbonized or annealed cast-iron tyres, as hereinbefore described, or any modification thereof.

To THOMAS BARKER WALKER GALE *and* JONATHAN FENSOM, *of Homerton, in the county of Middlesex, engineers, for their invention of improvements in the means of joining or coupling bands or straps.*—[Sealed 6th October, 1852.]

THESE improvements consist in the means of joining or coupling bands or straps; and have for their object, to join or couple the ends of bands, used in driving machinery, in a more convenient and expeditious, and consequently more economical, manner, than by the plans hitherto in use. Instead of joining these bands by means of lacing or studs, as is usually the case, the ends of the bands to be joined are firmly held together by two metal plates, one of which carries sockets, furnished inside with female screws, and the other plate has holes made through it to receive screws, which screw into the sockets of the other plates. The ends of the bands to be joined or coupled having been placed between these two plates, and the screw sockets passed through the holes made therein, the screws or bolts are screwed up tight, and the ends of the strap or band are thereby tightly squeezed between the two plates by means of the male screws of the upper plate.

The figure in Plate V. shews in section one of the improved couplings intended for a band, to be used with a flat-faced rigger *a, a.* *a*, a**, are the metal plates, and *b, b,* the sockets, fixed on the lower plate *a**, which is also covered with leather, gutta-percha, or some other suitable material, in order to prevent the metallic surface of the plate from coming in contact with the periphery of the pulley or rigger to which the band or strap may be applied. The sockets *b, b,* pass through holes made in the band or strap *c, c,* and they should be made of such a length as to admit of the band or strap *c,* being tightly pinched between the plates *a,* and *a**, when the male screws *d, d,* are firmly screwed up. For coupling broad bands or straps, or when the band is to be applied to round-faced riggers, it is preferable to divide the coupling into two or more parts, so as to admit of its bending or yielding when at work, or to cause it to embrace and fit the round face of the rigger more perfectly. The internal construction of the coupling is precisely the same as the one above described.

The patentees claim, joining or coupling bands or straps by means of two metal or other plates, which are made to embrace the ends of the said bands or straps, and squeeze them tightly together, as above described; and, whether such plates be covered or not, to prevent metallic contact with the rigger.

To William Oxley, *of Manchester, merchant, for improvements in apparatus for heating and drying.*—[Sealed 1st October, 1852.]

This invention consists in causing currents of air to be heated by steam or other medium, when passing through different series of tubes contained in a cylindrical or other shaped box; also in collecting the said heated air in a chamber, in which it becomes mixed to a uniform heat, previous to entering another series of tubes.

In Plate IV., fig. 1, is a side elevation; fig. 2, an end view; fig. 3, a transverse section; and fig. 4, a plan view, shewn partly in section, of the improved apparatus. *a*, is the exterior casing; and *b, c, d*, are three cylindrical boxes, placed within the casing *a*. The lower boxes *c*, and *d*, are secured at both ends to the end plates of the casing; but the box *b*, is somewhat shorter than the other two; the object of which will be hereafter explained: *b**, *c**, and *d**, are tubes in the boxes *b, c, d*. The air to be heated is forced through the tubes *b**, *c**, *d**, by means of the fan *e*. *f*, is a mixing chamber, in which the air, after passing through the tubes *d**, and being partially heated, is mixed to a uniform temperature before it enters the tubes *c**; and *g*, is another mixing chamber, connecting the tubes *c**, to the tubes *b**. The steam or other medium, by which the apparatus is heated, is admitted into the box *b*, by the pipe *h*; and, after circulating among the tubes *b**, is conducted by the pipes *h**, to the boxes *c*, and *d*, as shewn at fig. 3. *i, i*, are pipes, furnished with dampers, through which the heated air is conveyed to the drying frames, or disposed of as may be required.

The operation is as follows:—Steam or other heating medium having been admitted to the boxes *b, c*, and *d*, motion is given to the fan *e*, and the air to be heated enters into the casing of the fan, through the openings *e**, and is forced through the tubes *d**, in the chamber *d*; then through the mixing chamber *f*, into the tubes *c**, in the box or chamber *c*; from whence it passes through the mixing chamber *g*, to the tubes *b**, in the box or chamber *b*. The air, on leaving the

tubes b^*, which are fastened in the end plate a^*, enters the space between the exterior of the boxes *b*, *c*, and *d*, and the interior of the casing *a*; from whence it is drawn off through the pipes *i*. In some instances the outer casing may be dispensed with, and the heated air conveyed direct from the tubes b^*, to the object or room to be heated or dried.

Figs. 5, and 6, shew a modification of the apparatus for heating and drying; fig. 5, being a side elevation of the apparatus, and fig. 6, a sectional plan view of the same. The principal difference between this and the apparatus above described, is, that in the present instance, the series of tubes and the mixing chambers are all in the same line. *k*, is the outer casing; *l*, *m*, and *n*, are three series of tubes, separated from each other by the mixing chambers *o*, and *p*; *q*, is a fan, for creating a current of air; *r*, is the pipe for conveying the steam to the tubes through which the air passes; and *t*, the pipe which conveys the heated air to the object or apartment to be heated or dried. The pipe *r*, is placed in communication with the tubes *n*, in order to give the greatest amount of heat to the air, as it leaves the apparatus, and to connect the series of tubes *l*, *m*, and *n*, by the double branch pipes *s*, *s*; but this arrangement may be varied according to circumstances. It will be necessary to place taps (which are not shewn in any of the figures) near the bottom of all the boxes containing the tubes, to let off the condensed steam.

The patentee remarks, that in some cases, it may be preferable to produce the current of air to be heated, by placing the fan in the off pipe, and thereby drawing it through the tubes; and it may also be desirable to increase or diminish the number of boxes containing the tubes, in order to adapt the apparatus to particular purposes.

The patentee claims, heating air, by causing it to pass through series of tubes, connected with each other by mixing chambers, as hereinbefore described.

To Henry Mortlock Ommaney, *of Chester, for an improved furnace for melting of metals in crucibles.*—[Sealed 1st October, 1852.]

This invention relates to an improved furnace for melting metals in crucibles, and consists in arranging or building the furnace in compartments, in such a manner that the coke is not brought into contact with the crucibles. For this purpose the furnace is constructed with two or more compartments; but three or four are found to be more desirable. If three or four

compartments are used, one of them is called the "crucible chamber," into which the flues are directed from the other two or three compartments, which may be called the coke chambers, and which are ascertained to be more advantageous when fed from above.

This arrangement of using three or four chambers is found to be the means of effecting a great saving of time, labor, and materials over the furnaces which have hitherto been employed to effect the same purpose.

To GEORGE GWYNNE, *of Hyde-park-square, in the county of Middlesex, Esq., and* GEORGE FERGUSSON WILSON, *of Belmont, Vauxhall, in the county of Surrey, managing director of Price's Patent Candle Company, for improvements in treating fatty and oily matters.*—[Sealed 4th January, 1853.]

IN commencing their specification, the patentees remark that they have found that fatty and oily matters, which have been treated with powerful acids, do not burn well, or distil freely, owing, as is supposed, to a combination or intimate mixture of the acid with the fatty or oily matter. The present invention is designed to decompose, separate, or remove the above-mentioned combination or intimate mixture; which decomposition, separation, or removal, is effected by operating on fatty and oily matters, that have been subjected to the action of powerful acids, by boiling such matters in water, or water mixed with acid, or by steam, or watery vapour combined or free.

Let it be supposed that palm oil is the material to be operated upon, and that the agent to operate with is sulphuric acid:—The palm oil is to be kept at the temperature of about 150° Fahr., until the impurities, mechanically mixed with it, have subsided. It is then to be pumped up into large copper vessels, similar in shape (only much larger, and without the condensing apparatus) to the stills described in the specication of a patent obtained by the patentees in November, 1843. These vessels, which are called acidifiers, are to be connected together in pairs, in such manner that the steam may be turned from the one acidifier to the other when required: by this means a considerable economy of fuel will be obtained. When the temperature in one acidifier attains about 300°, the steam which issues from it is to be let into the adjoining vessel, also containing palm oil. Instead of

the condensing apparatus of the stills, shewn in the drawings of the specification above referred to, a simple pipe, with a jet of water playing in it when at work, is to be substituted therefor; and the acidified matter is to be withdrawn from the vessels by means of large valves in the bottoms of the vessels, instead of through a discharge-pipe. When the acidifiers are charged, the temperature of the oil is to be raised to about 470° by means of heated steam (that is, steam which has attained a high temperature by passing through red-hot pipes after it has left the steam-boiler). The steam is then to be shut off, and the necessary quantity of sulphuric acid, say about 6 lbs. (s. g. 1.80) to the cwt. of palm oil, is to be added gradually. About two hours after the whole of the acid is added, communication with the steam-boiler is to be opened, and steam, of the ordinary temperature, is admitted, and continued for the space of about one hour; after which, the acidified matter is to be cautiously let down into a large wooden vessel, lined with thick sheet-lead, and containing "a free steam-worm," where it is to be boiled for about the space of one hour in its own bulk of a mixture of sulphuric acid and water, in the proportions say of 2 lbs. of acid to one gallon of water. As the temperature of the acidified matter will be very high, the acid mixture should be in a state of thorough ebullition before any acidified matter is admitted. The quantity of acid here recommended may appear very large; but this is not the case in reality; for the same acid mixture may be repeatedly used,—as the whole of the organic matter produced from the fatty material, and soluble in water, is totally destroyed at the temperature of 450°; whereas such is not the case where the acidification has been performed at 350° Fahr. The mixture of sulphuric acid and water is to be occasionally examined, in order that it may be kept at about the strength above recommended. If it should become too acid, a little water may, from time to time, be added. If, on the contrary, it should become too much diluted, it may be concentrated by means of heated steam, without being removed from the wooden vessel. When the acid mixture and the black dregs have settled well down, the clear acidified matter is to be drawn off into another vessel and boiled with free steam, for about an hour, in its own bulk of water, slightly acidulated by means of sulphuric acid. When the acidified matter has become "bright," it will be fit for use; and it will be found much improved in its burning qualities, and will distil more freely and with less loss than ordinarily prepared acidified matter.

Although it is preferred to treat the palm oil by means of heated steam, this part of the process might be modified in the following manner:—The palm oil, after the impurities contained in it have subsided, is to be let into a copper vessel, placed over the naked fire, and provided with apparatus for conveying free steam from an ordinary steam-boiler. The temperature of the oil is to be raised to 500°, and steam is to be admitted thereto during the heating up. When this temperature is attained, the oil is to be admitted into the acidifier, and the remainder of the operation is performed in the manner before described.

The patentees remark that, during the course of their experiments, they discovered that ordinarily acidified matter might be much improved in quality by boiling it five or six times in its own bulk of plain water, and afterwards once in water acidulated with sulphuric acid.

When fatty and oily matters have been treated with other powerful acids, as for example, with nitric, nitrous, or hyponitrous acid, it is preferred to pursue the following method for purifying them:—Suppose a quantity of the crude material to have been already subjected to the action of the acid, and to be at the temperature of about 120° Fahr., and a wooden vessel to be provided, containing a free steam-worm, communicating not only with an ordinary steam-boiler, but also with a set of condensing-pumps—by which latter means a current of air can be forced along with steam into the matter under process; then into this vessel is to be let a quantity of plain water, equal in bulk to the fatty matter, and the temperature is to be raised to 212° Fahr. The fatty matter is then to be run in, and the boiling to be continued for thirty minutes,—a current of air, at the same time, being forced in by means of the condensing pumps. This operation of washing with plain water, in conjunction with a current of air, is to be repeated five or six times; and the fatty material is to be finally washed in its own bulk of water, acidulated by means of nitric acid: it will then be fit for use.

To Edward Clarence Shepard, *of Duke-street, in the City of Westminster, for improvements in the manufacture of gas.*—[Sealed 4th January, 1853.]

This invention consists of a mode or modes of producing certain gases by the action of currents of electricity upon water having chemical matters dissolved in or mixed with it; and then combining or mixing the gas or gases, thus pro-

duced, with a gaseous hydrocarbon, and either with or without a portion of atmospheric air, for the purpose of enabling the mixed or combined gases, when burnt, to produce a larger quantity of light or heat.

The current of electricity employed may be obtained from any of the well-known sources; but it is preferred to produce such currents by the machines made according to the invention comprised under letters patent granted to the present patentee on the 24th day of October, 1850, and on the 6th day of July, 1852, respectively.

The chemical matter employed is dissolved in or mixed with the water, for the purpose of facilitating the production of the gases which result from the decomposition of water; and also for the purpose of rendering such gases more capable of combining with carbonaceous or hydro-carbonaceous matters.

Several combinations or mixtures of chemical matters may be used for these purposes, by combining a mixture of a mineral acid, as sulphuric acid, with an organic or vegetable acid, as oxalic acid, in such a manner that the proportions of the acids and the water will be in relation to the intensity of the decomposing current. The following proportions are those which the patentee has employed; but he does not confine himself to them; viz., one-twentieth of sulphuric acid, or other mineral acid, with nineteen-twentieths of oxalic acid, or other vegetable or organic acid. The oxalic acid must be pure, well crystallized, and dissolved in water, of a sufficient quantity that the liquid shall be saturated at the temperature of 15° Centig. before adding the sulphuric acid. The water, mixed with or holding in solution any of the above chemical mixtures, may be placed in any convenient vessel, in which it may be subjected to the action of the electric current or currents,—means being provided for the gases to escape or pass from the generating vessel into some convenient receptacle.

The gases, thus produced, by the decomposition of water, are then mixed or combined with some hydro-carbon. Any hydro-carbon (if it be sufficiently rich in carbon) may be used for this purpose. The following is a mode adopted by the patentee for the purpose of producing a gaseous hydro-carbon:—Metallic sponges are first prepared, by soaking pieces or fragments of coke obtained from pit-coal. These are well saturated by a solution of nickel or cobalt, and heated in a covered crucible. The metallic sponges are then put into a copper or other convenient vessel, with the essence of resin, which is subjected to heat for the purpose of converting it, or as much of it as is practicable, into a gaseous hydro-carbon.

The gases produced by the decomposition of water, are

mixed with the gaseous hydro-carbon, and with or without a portion of atmospheric air, for the purpose of forming a mixture or combination of gases for the purposes required.

The patentee claims, First,—the addition of a vegetable or organic acid with the mineral acids and water, in the apparatus for decomposition, for the purpose of producing a gas or mixture of gases, as hereinbefore described. Secondly,—the use of metallic sponges in the process of converting the essence of resin into a hydro-carbon gas, as hereinbefore described. Thirdly,—the combining or mixing the gases produced by the action of currents of electricity upon water and the gaseous hydro-carbon (obtained as before described) together, with or without a portion of atmospheric air, for the purposes of heating and lighting, as before described.

To Joseph James Welch *and* John Stewart Margetson, *for certain improvements in the manufacture of travelling cases, wrappers, and certain articles of dress hitherto manufactured of leather.*—[Sealed 4th July, 1853.]

This invention consists in the use and application of woven fibrous materials in and for the manufacture of the following articles, viz:—travelling cases or portmanteaus, gaiters, slippers, leggings, splatterdashes or overalls, children's belts, railway or travelling wrappers, and such like articles. Hitherto some of these articles have been made of leather, and have therefore been found cumbersome and expensive. Now, the object of this invention is to make such of the articles as have hitherto been made of leather of a material lighter and cheaper than leather; and for this purpose the patentees employ flax, cotton, or other fibrous material, woven in the ordinary manner, and afterwards coated or covered with any elastic varnish or composition in known and common use, which will not readily crack, and presenting all the appearance of leather; and having cut out of this the shape of the article required, the parts are connected together by sewing, in a similar manner to that practised in manufacturing articles from leather.

The patentees claim the use and application of woven fibrous materials, coated or covered with varnish or composition, so as to resemble leather, in and for the manufacture of the above articles, as hereinbefore particularly described and set forth.

To Thomas Lawes, *of the City-road, for an improved quilt or coverlid.*—[Sealed 1st October, 1852.]

This invention refers to improvements in quilts, formed by enclosing feathers or other materials in a suitable fabric, and consists in so stuffing or filling the same that they may be taken to pieces for the purpose of cleaning. This quilt or coverlid is made by stitching the outer material together in strips or rows, which run the whole length of the coverlid, parallel to each other. The rows of stitches or quilting are made at such distances from each other as to leave a sufficient space between them for filling, according to the quantity of feathers or other material required to produce the necessary warmth from the coverlid. The distances between the rows of stitches form hollow spaces or bags; the ends of which are left open for the purpose of being filled with the feathers or other material; after which, they are closed, in the usual manner, by sewing. The coverlids, which may consist of a fabric, more or less ornamented, are to be filled with loose feathers, as previously described, or with the feathers or other material enclosed in bags of calico, or other suitable fabric, of sufficient width and length to fill the spaces in the coverlid.

Both of these systems of filling may be used with advantage, and, in either case, the quilts may be emptied of their contents for the purpose of washing or cleaning the covering. The quilt may thus be taken to pieces, cleaned, and refilled with little trouble and expense. The use of separate bags, containing the feathers, is found to be the most desirable, as they will effectually prevent the feathers from working through, and may be taken out from the coverlid when it is required to be washed or mangled, without any annoyance from the material flying about, and making the room dirty or dusty. These coverlids may be filled with any suitable material; but strippings taken from the most downy parts of feathers, free from stalks or stems, are found to be the most appropriate.

The patentee states that he is aware that feathers have been heretofore used in quilts or coverlids, but they have been so enclosed as to render it difficult and scarcely possible to clean such quilts with advantage. He claims, as his invention, enclosing the feathers, or other stuffing material, in such manner, and in spaces from which it may be readily removed, substantially as hereinbefore described.

To George Kendall, *of the City of Providence, United States of America, Gent., for certain improvements in apparatus to facilitate the manufacturing of mould candles.*—[Sealed 12th November, 1852.]

The chief object of this invention consists in diminishing the manual labor and expense of moulding candles, and performing many of the nicer parts of the operation automatically,—thereby rendering it, in a great measure, independent of the skill of the workman.

The first improvement consists in an arrangement of cars and railways; by means of which the moulds are run, when empty, to the oven to be heated; thence to the vessel containing the melted fat by which they are to be filled; thence to a stand, to remain until the fat is set; thence to the apparatus by which the candles are drawn out of them, and a fresh supply of wick drawn in.

The second improvement consists in an apparatus for drawing the candles from the moulds, and is large enough to draw all the moulds of a car at the same time; and is so placed and arranged, with respect to the railway, that any number of cars may be brought up to it, in succession, to have the candles drawn from their moulds, and the latter re-wicked, ready for the reception of another charge of fat.

The third improvement relates to the mould, and consists in fitting the tip or lower end thereof with an elastic cap, perforated with a hole, sufficiently small to embrace the wick tightly, so that an amount of force is required to pull the wick through, sufficient to stretch and straighten it in the mould; while, at the same time, the escape of fat is effectually prevented.

The fourth improvement consists in mounting the spools of wick and a series of stands of moulds upon a car, in such manner that the whole may be carried about, from place to place, during the various operations, in their proper relative order; thereby avoiding the derangements and re-adjustments that become necessary when the moulds are worked in the usual manner.

The fifth improvement relates to the centering of the wicks in the moulds, and consists in extending the wicks through the moulds from the tips or lower ends thereof, towards one side of their upper ends, in such a manner that the centering apparatus will be sure to act properly upon each wick.

The last improvement consists in an apparatus for drawing the candles from the moulds, and for centering the new wicks

therein, preparatory to the introduction of the melted fat; whereby the operation of drawing a whole stand of candles is effected as expeditiously and readily as the drawing of a single candle; and the centering of the wicks of a row of moulds is effected with greater expedition and accuracy than the wick of a single mould could be centered by the eye and hand of even the most skilful workman.

The moulds are mounted upon cars, by which they are carried from place to place as required. Each of these cars carries several dozens of the moulds; and the latter are heated to about the temperature of the melted fat (with which they are to be filled) by running the car into an oven. After the moulds are thus heated, they are carried by the cars to a cauldron containing the melted fat, and filled therewith. The car is then run to one of the empty tracks, and permitted to stand until the candles are cooled; and it is then moved to an apparatus by the aid of which the candles are drawn, and the moulds re-wicked ready to be again heated and filled. To facilitate the transference of the moulds to different parts of the room, the cars, on which they are mounted, are carried about on trucks, fitted with rails at right angles to the track on which they run; so that the car, with the moulds, can be carried forward or back by the truck, and run to the right or left on its own wheels upon lateral tracks, as may be required.

In Plate V., fig. 1, represents a plan of the improved moulding apparatus, including the railways, cars, oven for heating the moulds, pot for melting the fat, the moulds, and apparatus for drawing the candles therefrom; fig. 2. represents a vertical transverse section through one of the mould-frames, shewing the candles drawn from the moulds; fig. 3, represents a top view of one row of moulds, shewing the clamp in place, ready to centre the wicks; fig. 4, represents a view, in perspective, of a centering gauge and its clamp, turned bottom side uppermost, by means of which the wicks are centered in the moulds, and so firmly fixed, that the candles, when set, can be drawn by it; and fig. 5, represents a plan of the centering and drawing-clamp inverted and closed. A, A, represent a series of railways, of the length of a car, for the purpose of receiving the cars after their moulds are filled, and permitting them to stand until the fat therein sets, or for the passage of cars to and fro from the tracks B, and C, which are at right angles to the tracks A, and at each end of them. The short tracks A, are on a higher level than the long tracks B, and C; so that the rails on the trucks D, and E,

which run on the latter tracks, may be on a level with, and form a continuation of, any of the tracks A, when placed opposite the same by the movement of the trucks. Upon the truck D, is represented a car G, with standards H, furnished with two series of moulds *m*. In every row of moulds the wicks are centered by a clamp I. When the candles which were last cast are drawn, and the wicks of each row of moulds on a car have been centered and clamped, a knife is passed along the top of each clamp, to separate the wicks of the drawn candles from the newly-clamped wicks in the moulds below. The whole of the moulds on the car having been re-wicked, and the centered wicks separated from the drawn candles, the truck is run back, until opposite an empty track A, (see fig. 1,) when the car, with its wicked moulds, is run across to the truck E, on the track C. The truck E, is then run along until the car G, is brought opposite the oven O, when the car is run therein to have its moulds heated to the proper temperature to receive the melted fat. After the moulds are heated, the car is run out of the oven upon the truck E, and carried by the latter to a melting-pot P, containing the fat, which is run from suitable stop-cocks into the moulds, or ladled therein, as may be deemed advisable. This being done, the truck is run opposite an empty track A, and the car is run thereon to rest, until the fat is set in its moulds; after which it is ready to be run up to the apparatus for drawing its candles, and re-wicking its moulds. While the moulds of one car are being heated and filled, and standing on the track for its candles to cool, the operation of drawing, re-wicking, and re-filling other moulds, is going on; so that, if the number of tracks, trucks, and moulds be sufficient, the operation may be continuous,—as the cars would have their moulds filled and drawn in endless succession, without any greater interruption than is requisite for changing from one car to another.

The stands H, for the moulds, are firmly secured to the cars, and the moulds to the number of, say twelve, are firmly secured in each stand, in an upright position, and at equal distances apart, in horizontal boards *a, b,* placed about two-thirds of the length of the moulds apart, in the upper portion of the stand-frame. The uppermost, *a,* of the horizontal boards, is placed an inch, more or less, below the top of the stand, and has a fixed ledge *c,* fastened on its rear edge; and a sliding ledge *d,* that can be moved up or down, is fitted to its front edge. When this front ledge is up, the two ledges and the ends of the stand form a tray, into which the upper ends of the moulds open; so that, when the fat is poured into it, all the moulds of the stand will be filled at once.

Preparatory to withdrawing the candles from the moulds, the cake of fat, which fills the tray, must be loosened: this is done by pressing down the moveable ledge *d*, and jarring the fat by a knock with the hand, which renders it sufficiently loose. The lower ends or tips *n*, (fig. 2,) of the moulds *m*, rest, in this instance, upon pieces of vulcanized India-rubber *o*, let into the lower cross-bar *e*, of the stands H. Each of these pieces of India-rubber is pierced with a hole, somewhat smaller than the wick; and, as the wick is passed through this hole, the India-rubber compresses it so tightly as to prevent the fat from leaking out. In like manner leakage is prevented between the bottom or tip of the mould and the rubber, by the pressure of the former upon the latter.

The spools K, hold wick enough to supply the moulds for several months. The end of each wick is passed from the spool up through the piece of India-rubber into the mould, and through the latter to the jaws of a clamp I, above, by which it is firmly grasped. All the wicks of each row of moulds in the stand are secured in one of these clamps.

When the moulds are filled, and the fat therein has set, or become sufficiently cool, the candles are drawn by lifting their clamps; and, as the wicks extend down through the candles to the spools, the act of drawing a candle out of the mould draws a fresh supply of wick therein; and, as a gauge or stop is provided for limiting the height to which the candles are raised, precisely the proper quantity of wick to supply the moulds, and leave a snuff on the candle, will be drawn from the spools.

The candles, after being drawn, are moved a little to one side, by the movement of the lifter, in order to incline the wicks in the moulds, that the notches of the gauge-plate of each clamp may be made certain to catch and centre the wicks; for if the wicks should happen to incline, some one way and some another, there would be no certainty of centering them, and an imperfect candle would, of course, be the result.

When the candles have been withdrawn, by raising one clamp, another must be ready to apply to the wicks between the tops of the moulds and tips or lower ends of the candles. It will be observed, that one of the jaws of the clamp I, is provided with a plate F, having a series of inclined teeth or notches in it, corresponding in number to the wicks it is designed to clamp. It will also be observed, that at the inner end of the clamp a narrow slot *g*, (figs. 3, 4, and 5,) is formed between the jaws; and at the outer ends a round hole *h*, is formed between the jaws when closed. It will also be observed, that two pins *i*, project up from the ends of the stands, in a line with the centre of each row of moulds.

Now, by applying the clamp, as shewn at fig. 3, in such a manner that the toothed jaw will rest against the pins *i*, and pushing it as far across the stand H, as the slot *g*, and pin *i*, will allow, and then drawing it back, each tooth or notch catches a wick, and moves it along until the hole *h*, in the front end of the clamp, is brought against the pin *i*, when every wick will be centered in its mould. The outer jaw of the clamp is now shut upon the toothed jaw, without moving the latter, and the two are held together by a spring-catch *r*. In order that the clamp may hold the wicks with equal firmness throughout its entire length, the adjacent sides of its jaws are made convex in the direction of their length; and one of them has a tongue or rib, and the other a corresponding groove; so that the wick, in being clamped, may be held firmly by the groove and rib, and prevented from drawing out; which is highly important, as the pulling of the candles from the moulds requires a considerable amount of force, which would draw the wicks from smooth jaws before the candles would rise. The front extremities of the jaws of the clamp are held together, when closed, by the spring-catch or hook *r*; and, when this catch is unfastened, the jaws are thrown open by a spring *s*, between the handles *t*. The jaws of the clamp are pivoted together in the manner of pincers, and the joint should be firm and strong, as the first operation, preparatory to drawing the candles from the moulds, is to loosen them by rolling the clamp slightly by its handles, which can only be done by applying considerable force.

The jaws of the clamps are preferred to be made of cast-iron for cheapness and convenience; but they may be made of any other suitable material. The moulds *m*, are made of metal in the usual manner, and are fixed in the stands in the ordinary way of fixing others.

The lifting of the clamps, to draw the candles from the moulds, is effected by means of flat hooks L, affixed to upright bars M, that slide up and down in oblong mortices in a frame N, (fig 1); and which, when raised, are counter-balanced by a weight, that preponderates sufficiently over the weight of the bars, with the clamp and candles hanging upon it, to keep them elevated. The flat hook L, at the bottom of the bar, is introduced beneath both the clamps of each stand, so as to draw all the candles of a stand simultaneously: the bar has sufficient play in the guide mortices to allow it to be swung back far enough to cause the hooks L, to enter beneath the clamps I, I. This bar is struck, by the hand of the attendant, a smart blow upon the bevilled corner *x*, of its

lower end, and at the same time lifted by the other hand, for the purpose of starting the candles out of the moulds: this is usually found to be sufficient; but if the candles should still remain in the moulds, a repetition of the knocking with one hand on the lower end of the bar, and of the lifting with the other, must be resorted to, which will prove, in every case, sufficient. Just as the bar approaches the limit of its upward motion, an adjustable inclined plane *y*, on one of its edges, strikes against the end of the guide-mortice, which deflects it far enough to throw the wicks to one side of the moulds, to ensure the proper action upon them by the centering notches of the clamp, as before mentioned.

The upward movement of the lifting-bars M, is determined by a pin *l*, (see fig. 2,) which is passed into a higher or lower hole in the bar, as it is required to raise the bar more or less. In this way the same lifting-bars are adapted to the drawing of candles of various lengths. When the candles have been drawn from the moulds of all the stands of a car, and the new wicks have been centered, the drawn candles are separated from the wicks by passing a sharp knife along the top of the lower clamps. The candles are then taken from the hooks L, and laid on a table or shallow tray, where they are separated from the cake of fat cast with them, by means of a knife. The candles, thus separated, are removed to a suitable receptacle, and the cake of fat and other trimmings are thrown into the melting-pot to be again melted and cast.

The cars G, are all of the same size, and contain an equal number of stands of moulds, which are all of the same size, and arranged in exactly the same relative position on each car, in order that, when the cars are run against a stop on the truck D, and the latter is run against a stop on the track B, under the frame N, the clamps I, may always be exactly in the proper position to be drawn by the hooks L.

The patentee claims, First,—the arrangement of the travelling and fixed railways, on which the moulds are transferred from place to place, as required in the process of casting candles, as herein described, in combination with an oven for heating the moulds, a melting-pot to prepare the fat for casting, and apparatus for drawing the candles from the moulds. Secondly,—the hooks, or the equivalent therefor, in combination with a series of moving stands of moulds, arranged and operating to aid in drawing the candles, in such manner as to dispense with much of the care and skill heretofore required for the performance of this operation.

Thirdly,—an elastic or a yielding cap for the lower end or tip of the moulds, which performs the two functions of stopper and friction-break, to stretch the wick. Fourthly,—the arrangement of the stands of moulds, with their wick-spools, on a series of cars, so that the corresponding stands of all the cars may, in succession, be brought into the proper position to be drawn and re-wicked by the same drawing apparatus. And, Fifthly,—the wick-clamp, constructed and operating as herein set forth.

To TIMOTHY MORRIS, *of Birmingham, manufacturer, and* WILLIAM JOHNSON, *of Washwood Heath, near Birmingham, Gent., for improvements in depositing alloys of metals.*—[Sealed 11th December, 1852.]

THIS invention consists in the employment of solutions composed of cyanide of potassium and carbonate of ammonia, to which are added cyanides, carbonates, and other compounds of metals, in proportions according to the amount of deposit required to be made.

In order that the invention may be fully understood and readily carried into effect, the patentees proceed to describe the means pursued by them as follows:—These improvements consist in the employment of solutions composed of carbonate of ammonia (the carbonate of ammonia of commerce or the sesqui-carbonate of ammonia of chemists) and cyanide of potassium, to which are added carbonates, cyanides, or other compounds of metals, in various proportions. For the well-known alloy, brass, carbonate of ammonia and cyanide of potassium are used in the following proportions; viz., to each or every gallon of water are added 1 lb. of carbonate of ammonia, 1 lb. of cyanide of potassium, 2 oz. of cyanide of copper, and 1 oz. of cyanide of zinc: these proportions may be varied to a considerable extent. Or the patentees take the before-named solution of carbonate of ammonia and cyanide of potassium, in the proportion of 1 lb. of each to one gallon of water; and they take a large sheet of brass, of the desired quality, and make it the anode or positive electrode, in the aforesaid solution, of a powerful galvanic battery or magneto-electric machine, and a small piece of metal, and make it the cathode or negative electrode, from which hydrogen must be freely evolved. This operation is continued till the solution has taken up a sufficient quantity of the brass to produce a reguline deposit. The solution may be used cold; but it is

desirable, in many cases, to heat it (according to the nature of the article or articles to be deposited upon) up to 212° Fahr. For wrought or fancy work, about 150° Fahr. will give excellent results. The galvanic battery or magneto-electric machine must be capable of evolving hydrogen freely from the cathode or negative electrode or article attached thereto. It is preferred to have a large anode or positive electrode, as this favors the evolution of hydrogen. The article or articles, treated as before described, will immediately become coated with brass: by continuing the process any desired thickness may be obtained. Should the copper have a tendency to come down in a greater proportion than is desired, which may be known by the deposit assuming too red an appearance, it is corrected by the addition of carbonate of ammonia, or by a reduction of temperature, when the solution is heated. Should the zinc have a tendency to come down in too great a proportion, which may be seen by the deposit being too pale in its appearance—this is corrected by the addition of cyanide of potassium, or by an increase of temperature.

The alloy, German silver, is deposited by means of a solution consisting of carbonate of ammonia and cyanide of potassium (in the proportions previously given for the brass), and cyanides or other compounds of nickel, copper, and zinc, in the requisite proportions to constitute German silver: it is, however, preferred to make the solution by means of the galvanic battery or magneto-electric machine, as above described for brass. Should the copper of the German silver come down in too great a proportion—this is corrected by adding carbonate of ammonia, which brings down the zinc more freely; and should it be necessary to bring down the copper in greater quantity, cyanide of potassium is added;—such treatment being similar to that of the brass before described.

The solutions for the alloys of gold, silver, and other alloys of metals, are made in the same manner as above stated, by employing anodes of the alloy or alloys to be deposited; or by adding to the solutions the carbonates, cyanides, or other compounds, in the proportions forming the various alloys; always using, in depositing, an anode of the required alloy. These solutions are subject to the same treatment and control as those of the brass and German silver before described.

The patentees claim the combination of the carbonate of ammonia, before named, or other carbonates of ammonia and cyanide of potassium, as the ingredients for their solutions for depositing alloys of metals.

Scientific Notices.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

(Continued from p. 53.)

A paper was read, "*On a new lubricating material,*" by Mr. JOHN LEA, of London.

Whilst extensive and valuable improvements have been made in the construction of the locomotive stock of railways, but little progress has been made in economizing the cost, and improving the efficiency of lubricating the numerous moving parts of this extensive property. Since the first establishment of railways, scarcely any change has been effected in the character of the materials employed for this important purpose; oil and tallow were originally adopted, and are still almost universally employed in the lubrication of locomotive engines, to which department the subject of the present paper has more particular reference. The more limpid lubricating materials are wanting in consistency to resist pressure, and the more solid fats want fluidity to make them available under ordinary temperatures. The varieties of oil have, consequently, been at all times the common resource; but even the majority, if not all, of these want the perfect properties requisite for faultless lubrication.

Both animal and vegetable oils, of every kind, contain native impurities which materially qualify their efficiency. Many of them contain earthy matter, which soon becomes converted into a viscous, impeding, and exciting substance, of such consistency that produces rapid abrasion of metallic surfaces, and consequently causes such increase of temperature as seriously tends to disintegrate or soften the metallic body. All oils contain more or less of watery particles, which produce oxidation of the necessarily polished surfaces of the motive parts of machinery, and thus gradually wear them away; whilst the fluid itself becomes vitiated by its own action. As a further characteristic, it may be observed, that those oils most in repute as lubricants, are of such limpid consistency, that they become inevitably extensively wasted by escapement. The desideratum, therefore, for this important purpose, is clearly some agent which shall possess all the necessary properties of smoothness and body, with adequate fluidity, and without the impurities and other defective characteristics of raw oils.

The new lubricating compound forming the subject of the present paper, is composed of carefully refined southern whale oil as a basis, to which are added India-rubber and levigated white and red leads, to constitute a kind of metallic soap, possessing the

necessary oleaginous lubricating property, adequate fluidity, and a body impenetrable by the pressure upon ordinary bearings. The oil is heated to from 400° to 500° Fahr., and India-rubber, cut up fine, is then added, to the amount that the oil will dissolve, less than 50 lbs. per ton of oil being sufficient. After the oil has become completely saturated with the India-rubber, the temperature is considerably reduced, and equal proportions of finely-powdered red and white lead are added, at the rate of about 25 lbs. of each per ton of oil.

The mineral ingredients perform the office of "vulcanizing" the compound, and presenting, in use, a microscopic non-conducting stratum of separation of the bearings, which precludes friction, and, consequently, heating and dissipation. In using the term "vulcanizing," it is intended to express the property of resisting any material change of consistency through any ordinary range of temperature; and it is found that the consistency of this compound does not observably alter through the extreme range of our English climate.

If there be no metallic contact between two surfaces, there can be no friction between them, and, consequently, no elevation of temperature; and, in the absence of undue heat, there will be no excessive dissipation of the lubricating material by volatilization. In the experiments made with this compound, it has been found that no pressure of bearing, or extreme of velocity, ever penetrated its substance, or produced any perceptible rise of temperature, and though it is gelatinous and as smooth as oil, its elastic body prevents penetration or displacement. It works freely with ordinary worsted or cotton syphons when the engines are in motion, but ceases to flow when they are stopped, avoiding the waste of continuing to flow, to which limpid oils are liable. All the experiments made with the new compound, under similar conditions, have resulted uniformly; and it may be sufficient to quote in detail, an experiment made on the Manchester and Crewe station of the London and North Western Railway. In this instance, the new compound was applied to one of the express engines (No. 15), and another engine (No. 8), of similar character, and performing equal daily service, was submitted to a careful comparison with oil and tallow. These experiments were continued over many weeks, and the following results were reported by the engineer. It has to be observed, that the prices of oil and tallow were not then materially different from their present cost, but the quoted price of the new compound has since been reduced to one half.

The distance run by the engines in these experiments was about 2340 miles each, in the eighteen days referred to; the cost of oil and tallow was found to be nearly *fourpence per journal* per 1000 miles, whilst that of the new compound was scarcely more than *one penny* for the same work, and would be, at the present reduced cost, only *one halfpenny per journal per* 1000 *miles*. This new compound is considered to possess lubricating properties

much superior to those of any other natural or manufactured article, involving, as it does, remarkable efficiency combined with economy of cost; and it has the important advantage also of only requiring to be supplied at long intervals; thus preventing almost the possibility of accident arising from the exhaustion of the supply in the course of any single journey.

The author of this paper recently obtained from a number of railways, statements of their average cost of lubricating locomotive engines and tenders, and the general result shewed an average cost of about *one shilling* per journal per 1000 miles; the range of cost being very limited, as none exceeded fourteen pence per journal for that distance, nor is any under eleven pence, including, in all cases, the lubrication of the other parts of the machinery besides the axle journals.

Mr. Lea exhibited a specimen of the lubricating composition, and explained that the India-rubber, the ingredient on which its qualities mainly depended, caused the dark color, and the composition was made of different degrees of thickness, to suit the different kinds of bearings, by varying the proportion of the red and white lead. In the manufacture of the composition, the oil took up only a limited portion of the India-rubber, which was soaked in it whilst at the boiling point; the red and white lead were then added, simply in mechanical mixture, and thickened the compound to the degree required. He mentioned that the compositition had been patented by Mr. Donlan in 1848, but had remained dormant till the present time, when he, Mr. Lea, had taken it up.

In answer to a question of the Chairman, Mr. Lea replied, that no settlement was found to take place in the composition, after standing for some months: the thinner kind flowed as freely as oil in the ordinary syphon cups, and the thicker kind was adapted to the bearings of heavy shafting, and was found to keep them cool in cases where water was otherwise required. It was also found to work as well in cold weather as in hot; the cost of it was sevenpence or eightpence per pound, but the proportionate quantity used was considerably less than of oil or grease.

The following paper, by Mr. T. T. Chellingworth, "*On Messrs. Cox & Wilson's portable single-acting steam-engine,*" was next read.

The subject of the present paper is a small portable high-pressure steam-engine, differing from other engines of the kind mainly in the simplicity and economy of its construction, the small number of its parts, and the consequent diminished liability to derangement, and greater durability.

An engine, similar to the present one, was suggested some four years ago by Mr. J. W. Wilson. It consisted of a solid plunger, working in an oscillating cylinder, the steam acting only one way;

the engine was partly drawn out at that time, but no further steps were taken until the subject was again brought forward recently, and a drawing was made by the author, who introduced the self-acting trunnion-valves, as being more simple and less expensive than the slide-valve and gearing. One of these engines was made and set to work at the Oxford Works in September, 1852, and has been at work ever since, and is now in as good order as on the first day it was started, although running at an average rate of 150 strokes per minute.

The author, in describing this engine, stated, that the cylinder is made of cast-iron, bored out its whole length, the bottom screwed in, and the trunnions cast on. In the trunnion are the steam-ports, in which the steam-way connects the ports in the trunnion with the bottom of the cylinder, which has a cast-iron plunger working in it, and packed with hemp, and connected to the crank.

In working this engine the steam forces up the plunger, and the inertia of the wheel, assisted by the weight of the plunger, brings it down. As it is single-acting, the pressure is always on the valve; working, in fact, like an ordinary slide-valve, only on a curved, instead of a flat surface.

This engine has worked with the cap of the trunnion plummer-blocks removed, without leaking.

The author then proceeded to describe the general arrangement of the engine and boiler, fixed on wheels. The boiler is set in a cast-iron box with fire-bricks; the fire being under the boiler, and returning through two tubes. The water-gauge of this boiler consists of a piece of tube, working in a stuffing-box: a cock is fixed on the side of the pipe, with the end turning down into the tank, from which the engine draws its water. When it is required to ascertain the height of the water in the boiler, this cock is opened; and if it blows steam, the tube is pushed down till it reaches the water; if, however, it blows water, it is raised till it blows steam, and the level of the water in the boiler is indicated by the graduations upon the tube; thus forming a very simple and cheap water-gauge.

The principal advantages claimed for this engine are, its simplicity of construction, and consequent cheapness, and the very slight probability of its getting out of order, even in the hands of an inexperienced person, together with its compactness and portability.

Some of the purposes to which this engine is proposed to be applied, are as follows:—

When placed with a boiler on wheels, to be used in a factory where a number of machines are driven by a large engine,—if it is required to do some over work, in which, as is often the case, it is only necessary to drive one, or perhaps two, lathes, or other machines, this engine may, with a very little trouble, be wheeled up to its place and set to work; and the expense of running the large engine and shafting will be saved.

Also, in repairing the large engine, in case of a break-down, a great saving of time will be effected in not having the work done out.

For a donkey-engine, for feeding the boiler of marine and locomotive engines; and as a pumping-engine for tank-houses at railway stations, or other purposes:—In this case it is proposed to place the pump in a similar position to the steam cylinder, but opposite, on the other side of the frame, and to work the pump by a crank,—the two cranks being in opposite directions, so that the steam pressure acts to force the water.

It will be very applicable for small manufacturers and amateurs, &c., who may require a cheap and simple engine, and one not likely to get out of order.

This arrangement of cylinder and valves does very well for a force-pump; the water being drawn through the steam-pipe, and forced out at the eduction-pipe: in this case it is proposed to make use of it as a garden-engine, or a small fire-engine.

The governor that is proposed to be used for this engine, the invention of Mr. Wilson, consists of a cast-iron or brass ball, placed in the steam-pipe, which, at the governing point, is tapered and curved upwards; a stop being fixed to the steam-pipe to prevent the ball going so high in the pipe as to stick fast. The action of this governor is as follows:—as the steam rushes along the pipe, it carries the ball with it, which, as it ascends, decreases the area that the steam has to rush through; and the higher it rises in the curve, the greater is this contraction, and the greater must be the pressure of the steam to counteract the force of gravity on the ball. The governor now exhibited has been applied to the half-horse power engine at the Oxford Works, and is found capable of regulating it so well, that when all the work is thrown off, it will not allow the engine to run more than about 90 revolutions per minute.

Mr. Chellingworth exhibited one of the engines of half-horse power; also, the governor detached, to shew the action. In answer to a question, he stated that the cost of the engine exhibited was £10, and £18 complete, with the boiler on wheels, as shewn in the drawing.

In answer to a question put by the Chairman, Mr. Wilson said that the engine at the Oxford Works was supplied from the boiler of another engine; so that there was no means of ascertaining the consumption of fuel: the engine had been working constantly for six months, and had proved very useful and satisfactory.

Mr. E. A. Cowper observed, that he had seen the engine at work several times; it kept very fairly steam-tight, and he considered it would be usefully applicable to a great variety of purposes, on account of its being a very cheap construction, and a good engine.

Mr. Middleton thought the engine remarkably cheap, and a simple and convenient arrangement.

Mr. Chellingworth remarked, that there were very few parts in the engine, only about a dozen separate pieces altogether. The engine was often worked very fast, from 150 to 200 revolutions per minute; and, although so small, it was found very useful. It had drilled a number of 1⅛-inch holes in a large cylinder cover, 1½ inch thick, in 4½ minutes each. The surface of the valve was found to wear quite even, and after it had been at work a short time it appeared burnished, and had remained so.

The Chairman said he thought it was a very ingenious and simple construction of engine; and though it did not admit of the economy of working the steam expansively, yet the whole consumption would be so small, as to make that point of little consequence; and he thought it would be found very useful and economical in many applications.

After the meeting, a variety of specimens, illustrative of a new mode of ornamenting the surface of metals, were exhibited by Mr. R. W. Winfield and Mr. R. F. Sturges, of Birmingham. The process of the ornamentation is very simple, and consists in placing a sheet of perforated metal or paper, thread lace, net, &c., between the two plates of metal to be ornamented, and then passing the whole through a pair of ordinary rolls, such as are employed for rolling metal: this produces a very clear, sharp, and even deep impression, of the pattern employed upon the sheets of metal which it is desired to ornament. The depth of the indentation is such, that the metal so ornamented can be subjected to the various operations of stamping, spinning, &c., for producing the manufactured article in its complete form, without any injury to the pattern. Specimens of sheet-steel were shewn, which had been ornamented with ordinary thread lace; and the delicate skeletons of leaves had left an impression on the surface of a copper-plate, from which engravings had been printed in the manner of the ordinary copper-plate printing: copies of which were exhibited.

Messrs. Salt and Lloyd, of Birmingham, also exhibited specimens of a new process for raising or stamping vessels, &c., formed from sheets of iron, tin, brass, &c., by which greater economy and rapidity are obtained than by the ordinary process. A heavy ram, of 1½ tons weight, is raised by steam power a short distance, of about a foot, between guides, having the convex die attached to the under side of the ram, and the concave die or matrix is secured to the bottom of the frame, as in ordinary stamping: the edges of the flat metal plate, to be raised or stamped, are then forcibly held down upon the matrix by a metal ring, pressed down by excentrics, whilst the blow is struck by the ram falling, and driving the die through the ring into the matrix, which it fits accurately; the pressure of the ring on the edges of the metal plate being so adjusted, as to allow the plate to draw uniformly into the required form without the edges becoming puckered: the metal is stamped cold.

Scientific Adjudication.

COURT OF EXCHEQUER, GUILDHALL.

Before Chief Baron Pollock,—July 6th, 1853.

PALMER *v.* WAGSTAFF AND ANOTHER.

THIS was an action brought by Mr. Palmer, the large candle manufacturer, of Sutton-street, Clerkenwell, against Messrs. Wagstaff and Harrison, of the City, candle-makers, for the alleged infringement of a patent granted to the plaintiff, June 1st, 1839, for "improvements in lamps and in the manufacture of candles." Mr. M. Smith, Q. C., and Mr. Webster, appeared on behalf of the plaintiff; and Mr. Bramwell, Q. C., and Mr. Willes, for the defendants.

Mr. M. Smith, in opening the case, stated that the invention related to the manufacturing of candles that required no snuffing, and consisted in the use of two or more platted wicks, arranged in such a manner that they would bend outwards as the candle became consumed. Candles, with a single platted wick, had formerly been made, but double-platted wicks, formed by setting platted wicks back to back, were, at the time of the plaintiff's patent, a new manufacture; and it was for the making of candles with such wicks, by the defendants, that the present action for damages was brought. Other matters were patented with this invention, but ultimately abandoned by means of a disclaimer, from a doubt as to their novelty. The plaintiff is the inventor and patentee of many improvements; many of which, in the working out, have engaged his attention to the neglect of others; and among those which have not been extensively worked is the patent now under consideration; but that does not affect the question at issue; for if it is found that the defendants have used the plaintiff's invention, that will prove its utility, and will entitle the plaintiff to a verdict. In support of the case, a witness was first called, who deposed to the purchase of the defendants' candles. Mr. Carpmael was then called, and deposed, that he was acquainted with the manufacture of candles,—had read plaintiff's specification,—the first and third heads were disclaimed; the second or remaining head refers to a particular mode of using platted wicks, two or more in the same candle, so that they shall turn out from the flame and from each other. The specification describes, with great minuteness, the mode of making and applying the platted wicks by stringing them on to a wire. On cross examination, he admitted that plaintiff had taken out about twenty patents, offensive and defensive. Witness had seen a few candles made in conformity with the specification. A certain rule must be observed in applying the plat to the wire by which

the wicks are inserted into the candle-moulds, because the wick bends in one direction when that side of the plat which shews the strands as running from the edge upwards is presented to the wire; and in the reverse direction, when the face with the strands running from the centre to the sides upwards is presented to the wire. It is necessary, therefore, to give the plat a half turn, when it is doubled, to bring the corresponding sides outwards. On his attention being called to the drawing, which shews the wire for inserting the wicks into the candle-moulds, and that part of the specification which has reference to the drawing, being read, he found the two did not agree; that the letters of reference were misplaced; and that two notches, at the top of the wire, were mentioned and referred to, while only one was shewn. He did not, however, consider these errors material, as a workman could not fail to make candles from the specification.

Mr. Palmer, the plaintiff, being called, stated that he had given great attention to candle-making. The platted double wick is his own invention. Has used, but not sold these patent candles. The manufacture has been very limited,—not exceeding a few dozen candles. Never attempted to bring this manufacture before the public. The candle is a good one, and a decided improvement upon a single-platted wick.

Mr. Joseph Bull, a chandler, of 34 years' experience, testified to the novelty of the invention, at the date of the patent.

Mr. Charles May, civil engineer, deposed that he had read the specification, and was satisfied that a workman could not fail, ultimately, to accomplish the result desired.

George Hunt, in the employ of plaintiff, deposed that he had made candles from the specification; produces one of his manufacture, and, at the request of the defendants' counsel, puts a platted wick upon the holding wire, in a manner suited for insertion in the candle-moulds; and, in doing so, places it in an opposite direction to that set out in the specification. This was the plaintiff's case.

Mr. Bramwell, on behalf of the defendants, commented upon the fact that the plaintiff was hedged round with patents, which, for the most part, could only be looked upon as obstructive patents; because they were not worked, and were never intended to be worked; as was proved by the one now under discussion having run for thirteen years, and being on the point of expiring, while only a few dozens of candles had been manufactured under it, and no attempt whatever had been made to bring the candles into public use. He then proceeded to state, that not only was the specification defective, as to the description of the apparatus to be employed in inserting the wicks into the moulds, but that there was a positive misdirection as to the position in which the wicks were to be placed; that the workman, in stringing on a piece of plat, had so far departed from the specification as to set the op-

posite end of the wick to that described, at the top of the candle; and that, in point of fact, if the candle were lighted at the end directed, the wicks would converge, instead of diverging, and produce a long snuff. The learned judge, at this point of the argument, directed one of the plaintiff's candles to be lighted, with the bottom end uppermost, and the effect stated was soon apparent. Mr. Bramwell having concluded his address, in which some questions of procedure were raised and over-ruled,—

The Chief Baron said he should reserve the points, as to whether the patent was infringed, which depended upon the construction of the specification, as to whether it was for the principle of twisting the plat, so as to bring the corresponding sides outwards, or for the means employed; which latter, it was admitted, the defendants had not used. In leaving the case to the jury, the learned judge said, that, in legal language, it was a fraud on the law of patents for any person to take out a patent with a view to the obstruction of improvements. The defendants might have a better plan of manufacture, but plaintiff says you shall not make. Now it is not sufficient for the maintaining of a patent to prove that the article produced under it is useful,—it must be the invention that effects the utility. Thus, a patented manufacture should be either better in quality or cheaper in cost than that which it is intended to supplant. The fact of the candles burning and giving light is not evidence therefore of utility. The evidence shews that Mr. Palmer never made and never offered his candles to the public, and only now brings his patent into notice to day, to stop the defendants from a course of improvement. If there had been a plea that the patent was taken out as an obstruction, he (the learned judge) should have directed a verdict to be given for the defendants. With respect to the errors shewn to exist in the specification, it was the rule to read a specification, when fairly drawn, with indulgence, with a view to understand and not misunderstand it; but if, as Mr. Bramwell has said, the candle is to be made, not as described, but to be burned at the opposite end to that pointed out, this is a serious mistake. The jury would have to consider the value of this objection, and, generally, whether the specification was sufficient; they would also have to say whether any damage could have been sustained by the plaintiff, who had never done anything under his patent; and whether the patent is of public utility.

The jury said they had long since come to the conclusion that the plaintiff had sustained no damage; but, on the issue of infringement, they found a verdict for the plaintiff,—damages one farthing.

NISI PRIUS SITTINGS, YORK.

Before Mr. Justice Wightman.—July 18th and 19th, 1853.

TETLEY *v.* EASTON AND AMOS.

This was an action for the alleged infringement by the defendants of a patent, granted to the plaintiff on the 11th February, 1846, for "improvements in machinery for raising and impelling water and other liquids, and also thereby to obtain motive power." The counsel for the plaintiffs were,—Mr. Atherton, Mr. H. Hill, and Mr. Kemplay; for the defendants,—Mr. Knowles and Mr. Hindmarch. The ground of complaint, as stated by Mr. Atherton, was, that the defendants, in making the centrifugal pump, known as "Appold's" (which had attracted so much attention at the Great Exhibition), were, in fact, employing substantially the same construction and combination of parts as were set forth and claimed in the specification of the plaintiff's patent. The case came on for trial before Chief Baron Pollock, in December last, and, from the defective nature of the specification, a verdict was entered for the defendants.* Since that time (on the 26th April last), the plaintiff had obtained leave of the Solicitor-General to disclaim certain parts of his specification; and he now sought to substantiate the validity of his patent as against the subsequent acts of the defendants, who had continued the manufacture of Appold's pumps at their works, at the Grove, Southwark. In support of the case for the plaintiff, Mr. Hawkesley, Mr. Carpmael, Mr. Crispe, Mr. Bessemer, and Robert Hall, were called, who severally deposed to the novelty and utility of the plaintiff's invention.

It appeared that the plaintiff claimed the use of a lifting-wheel, with side discs, and a water channel between; a model of which was shewn in court; such wheel being so mounted in a case, that water might be introduced on both sides to balance the wheel. The plaintiff had not, however, in carrying out his invention, used a wheel with discs and blades.

On cross-examination, the attention of the witnesses was severally called to Delap's patent of 1821; and they admitted that an ordinary workman could introduce the spokes between the discs, recommended by Delap, and then that would be plaintiff's wheel; but then Delap did not admit the water at both sides.

They were then cross-examined as to Hale's patents of 1830 and 1831; and it was elicited that Hale introduced water on both sides (and even balanced his wheel with the water on *one* side only), but plaintiff insisted that the fans used by Hale were not blades, but propellers or beaters.

They were then cross-examined as to Clark's blower, patented in 1833; and admitted, that with sides to the wheel, it was "a colorable imitation" of plaintiff's wheel, for it admitted water on both sides, and would raise water.

* For report of this case, see Vol. XLII., p. 52, Lond. Jour.

Ruthven's patent of 1841, which extended to air, gas, and water, was then adverted to. The witnesses admitted that this machine combined the two properties; having a wheel with discs, blades, and sides, and providing for the admission of the media at both sides.

Mr. Knowles, on behalf of the defendants, submitted that the plaintiff's specification was clearly bad. According to that specification an improvement was claimed in the mode of forcing water by centrifugal action. As one step in that arrangement, a wheel of a particular configuration was claimed. If that were an essential part of the patent, then if that were old, and it was not pointed out in the description as being old, it made the whole description bad; because if the plaintiff took matters which had been known before, and combined them together, that might form a good patent; but beyond that, the public, from the specification, did not know what was new and what was old.

It appeared by the evidence of the plaintiff's witnesses that there was nothing new in the plaintiff's wheel, nor in the admission of the water on both sides. It was the duty of the plaintiff to state that the wheel was not new; he claimed various matters in combination, some of which might be new, and some of which were certainly old; but as he had not pointed out that which was old, the patent was vitiated altogether. He urged one or two other objections, but the one above stated was the most material one.

Mr. Atherton submitted that notwithstanding the general terms in the specification alluded to, the claim was to be understood as a claim to a certain machine or apparatus.

Mr. Justice Wightman:—Yes, composed of several parts; and that is the difficulty you have to overcome, that there is nothing clearly shewing that the wheel itself is not included in this novelty, abstractedly from the combination. The world ought to know that there is nothing but a combination that you claim; because the wheels, the suction pipes, and all the rest, are admitted to be old.

Mr. Atherton was understood to remark, that the wheel was plaintiff's novelty in combination.

Mr. Justice Wightman said it would not do to state the claim of the wheel in combination, and then say the plaintiff did not mean to include the several parts. Supposing this specification were put in, and he were asked what the plaintiff claimed, he should make no doubt that the plaintiff claimed all the parts of the wheel as a novelty. He ought to have disclaimed the whole. He should therefore rule that the objection taken by Mr. Knowles was a fatal one. A verdict was accordingly entered for the defendants on the two principal pleas, viz:—that the plaintiff was not the first inventor, and that the plaintiff's supposed invention was not any manner of new manufacture.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Cases in which a full Specification has been deposited.*]

1548. Antoine Andraud, of Paris, for certain improvements in railways and locomotives running thereon, which improvements facilitate the ascension of steep inclines.—[*Dated June* 25*th.*]

1589. John Jaques, the younger, of Hatton-garden, for improvements in the manufacture of chess-boards and chessmen.—[*Dated July* 2*nd.*]

1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine, of Belfast, for improvements in preparing for weaving wet spun yarns of flax and tow.—[*Dated July* 13*th*].

1684. Patrick O'Malley, of Dublin, for a new liquid beverage.—[*Dated July* 15*th.*]

1711. Donald Brims, of Southwark Bridge-road, for an improved safety apparatus for the protection and preservation of life on water.—[*Dated July* 19*th.*]

[*Cases in which a Provisional Specification has been deposited.*]

322. André Michel Massonnet, of Paris, for certain improvements in alloys of metal, and of other substances, and also in the application of the same to various useful purposes.—[*Dated February* 5*th.*]

761. Louis Michel Lombard, of Paris, for improvements in obtaining motive power.—[*Dated March* 30*th.*]

786. Sir James Caleb Anderson, Bart., of Fermoy, Ireland, for improvements in locomotive engines.—[*Dated April* 2*nd.*]

934. Hans Wallace Allen, of Great Portland-street, for a furnace which he calls the "vestal furnace," for the carbonization of peat or turf, or other substances.—[*Dated April* 18*th.*]

1131. Conrad William Finzel, of Bristol, for an improvement in refining sugar.—[*Dated May* 7*th.*]

1141. Frederick Lipscombe, of the Strand, for improvements in obtaining motive power.

1151. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for effecting agricultural operations,—being a communication.

The above bear date May 10*th.*

1258. William Chisholm, of Holloway, for improvements in the purification of coal-gas for the purposes of illuminating and heating, and obtaining by the ingredients used therefor manures, salts of ammonia, and sulphur.—[*Dated May* 21*st.*]

1301. John Nurse, of Crawford-street, Bryanstone-square, for improved mechanism for fastening and unfastening doors, applicable especially to doors of carriages.—[*Dated May* 26*th.*]

1309. William Wolfe Bonney, of West Brompton, for improve-

ments in machinery for raising a pile or flue by abrasion on linen, cotton, silk, and other fabrics.—[*Dated May 27th.*]

1313. Ebenezer Nash, of Duke-street, Lambeth, and Joseph Nash, of Thames-parade, Pimlico, for improvements in the manufacture of wicks.

1321. Edward Duclos de Boussois, of Paris, for improvements in preventing incrustation of steam-boilers.

1322. Henry Charles Hill, of Kingsland-road, for improvements in machinery and apparatus for the manufacture of hats, caps, and bonnets.

The above bear date May 28th.

1325. Joseph Brown, of Leadenhall-street, for the improvement of elastic spring beds, mattresses, cushions, and all kinds of spring stuffing for upholstery work generally; making them lighter and more portable.

1326. George Wells, of Upper East Smithfield, for the combination of materials for making a more perfect fabric for suction-hose, mill-bands, harness, and for all other similar purposes to which the same may be applied.

The above bear date May 30th.

1343. John Williams Thomson, of Sydenham, for improvements in heating hot-houses, hot-beds, pits, conservatories, houses, churches, and other buildings.—[*Dated June 1st.*]

1364. James Mayelston, of Elloughton, Yorkshire, for certain improvements in the manufacture and refining of sugar.—[*Dated June 3rd.*]

1375. John Chisholm, of Holloway, for improvements in the production or manufacture of artificial manures.—[*Dated June 4th.*]

1390. Frederick Lott, of Pimlico, for improvements in cartridges.

1392. Delabere Barker, of Islington, for certain improvements in the manufacture of blinds, shades, and other screens, from glass and other vitreous substances; also in the method or methods of raising, lowering, folding, and regulating such blinds, shades, and other screens.

The above bear date June 6th.

1394. George Bazett Colvin Leverson, of St. Helen's-place, for a new application, construction, and arrangement of springs for carriages and such like purposes,—being a communication.—[*Dated June 7th.*]

1405. George Bott, of Birmingham, and William Rushton, of Aston, near Birmingham, for a new or improved method of preventing collisions on railways.

1406. Henry Bernoulli Barlow, of Manchester, for improvements in machinery for spinning, doubling, and twisting cotton and other fibrous substances,—being a communication.

1407. George William Garrood, of Maldon, Essex, for improvements in propelling vessels.

1409. Claude Arnoux, of Paris, for a new system of towing and traction.
1410. William Muir, of Manchester, for improvements in turning lathes; a part of which improvements is applicable to other useful purposes.
1411. Joseph Smith, of Bradford, Yorkshire, for certain improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.
1412. Joseph Smith, of Bradford, Yorkshire, for certain improvements in combing wool and other fibrous substances.
1413. Edward Maniere, of Bedford-row, for improvements in the manufacture of paper.
1414. William Brookes, of Chancery-lane, for improvements in treating fabrics suitable for floor-cloths, covers, and such like articles,—being a communication.
1415. William Brookes, of Chancery-lane, for improvements in the manufacture of boxes and other hollow receptacles,—being a communication.
1416. James Robert Napier, of Glasgow, and William John Macquorn Rankine, of Rosebank House, Rutherglen, Lanark, for improvements in engines for developing mechanical power by the action of heat on air, and other elastic fluids.

The above bear date June 9th.

1417. Auguste Chesneau, of Leicester, for a new method of obtaining steam power.
1418. Henry Eld Symonds, of Seacomb, near Liverpool, for improvements in preserving meat.
1419. Josiah Moore, of Clerkenwell-close, for improvements in respirators.
1420. Samuel Frankham, of Greenland-place, Judd-street, for an improved construction of coupling joint, applicable to pipes, vessels of capacity, and other like uses.
1421. Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, for an improvement in spinning machinery,—being a communication.
1422. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of paper,—being a communication.
1423. Joseph Westwood and Robert Baillie, both of Poplar, for improvements in the construction of iron ships.

The above bear date June 10th.

1424. Christopher Nickels, of Albany-road, Surrey, and James Hobson, of Leicester, for improvements in the manufacture of carpets and other piled fabrics.
1425. Christopher Binks, of Albert Villa, North Woolwich, for improvements in dryers, and in preparing drying oils for oil paints, varnishes, and other uses.

The above bear date June 11th.

1426. Hugh O'Connor, of Frederick-street, Limerick, for digging the soil by means of machinery with horse-power.

1427. William Henry Smith, of Bloomsbury, for improvements in the permanent way of railways.

1428. William Smith, of Sheffield, for improvements in the mode of manufacturing metallic handles for knives and forks, backs for razors, bows for scissors, and the relative parts of such like instruments.

1429. John Marsh, Theophilus Marsh, James Marsh, and Walter Marsh, all of Sheffield, for an improved mode of fastening the handles of table knives and forks.

1430. Joseph Spencer, of Bilston, for a new or improved cupelo.

1431. Thomas James Perry, of the Lozells, Aston juxta Birmingham, for an improvement or improvements in raising and lowering Venetian and other blinds; applicable also to the raising and lowering of other bodies.

1433. William David Paine, of Thomas-street, Stamford-street, and George Alfred Paine, of Clark's-mews, St. Marylebone, for an improvement in the construction of steam boilers, and in steam boiler furnaces.

1434. Gonsal Auguste Hiacinthe Justin Fremin, of Paris, for certain improvements in the construction of steam-boats.

1435. Robert Hopkins, of Manchester, for improvements in machinery or apparatus for cutting and shaping cork-wood and other similar substances.

1436. Joseph Webb, of Mayfield-terrace, Dalston, for improvements in obtaining motive power.

The above bear date June 13th.

1437. William G. Craig, of Newport, Monmouth, for improvements in axle-boxes, guides, and bearings of locomotive engines and carriages; parts of which improvements are applicable to the bushes and bearings of machinery.

1438. Robert William Sievier, of Upper Holloway, and James Crosby, of Manchester, for improvements in looms for weaving.

1439. Joseph H. Penny and Thomas B. Rogers, of New York, for a new and useful improvement in the manner of constructing machinery for propelling vessels and other machinery, which they term a crank propeller.

1440. John Henry Johnson, of Lincoln's-inn-fields, for improvements in railway-brakes,—being a commnication.

1441. Thomas Richardson, of Newcastle-upon-Tyne, for improvements in the manufacture of certain salts of magnesia, and a red coloring matter.

1442. Joseph Leon Talabot, of Chaussée d'Antin, Paris, and John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of iron.

1443. Alfred Vincent Newton, of the Office for Patents, Chancery-

lane, for an improved mode of manufacturing cast-steel,—being a communication.

The above bear date June 14th.

1444. George Burstall, of Fenchurch-street, for improvements in the bleaching of oils and fats, and in machinery and apparatus connected therewith.

1445. Arthur Parsey, of Crescent-place, Burton-crescent, for a revolving engine to be worked by steam, air, gases, or water.

1446. Thomas Butterworth, of Meanwood, Yorkshire, for a machine for ploughing land, harrowing and crushing clods at one operation.

1448. Alexander Robertson, of Holloway, for improvements in vessels or cases for storing and preserving edible substances.

1449. Charles Wye Williams, of Liverpool, for improvements in the manufacture of sheet iron, and of iron plates used for boilers, vessels, buildings, and other like purposes.

1450. John Macintosh, of Pall Mall East, for improvements in the construction of portable boats or vessels and buoys.

1451. Jules Dehau, of Paris, for improvements in the manufacture of yarn, and fabricating articles therefrom.

1452. Jules Dehau, of Rue Pigale, Paris, for improvements in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard, by the application of a material not hitherto used in Great Britain for such purposes.

1453. James Dilkes and Edward Turner, of Leicester, for improvements in door-springs.

1454. John Jeremiah Payne, of Upper King-street, Bloomsbury, for certain improvements in axles.

1455. William Gossage, of Widnes, for improvements in obtaining certain saline compounds from solutions containing such compounds.

1456. John Elliott, of Oak-lane, Limehouse, and John Brown, of the same place, for improved machinery for making rivets, spikes, and screw blanks.

1457. Timoléon Zoé Louis Maurel, of Paris, for certain improvements in horological alarms.

The above bear date June 15th.

1458. William Baddeley, of Angel-terrace, Islington, for an improved label damper.

1459. Edward Walmsley, of Heaton Norris, and John Holmes, of Manchester, for improvements in and applicable to steam-engines.

1460. William Henry Grey Field, of Kennington, for certain improvements in the construction of barges and vessels, and in the mode of steering.

1461. William Christopher, of Euston-square, and Gustavus Gidley, of Hoxton, for improvements in abstracting sulphur and other matters from vulcanized India-rubber.

1462. John Blair, of New Milns, Ayrshire, for a new and improved mode of cutting lappet cloths or other similar fabrics.

1463. James William Gibson, of Long-acre, for a new method of pavement, tending to secure the evenness of the road and proper adhesion to the foot.

1465. Joseph Ilsley, of Lisbon, for improved telegraphic apparatus.

1466. Richard Archibald Brooman, of Fleet-street, for improvements in machinery for sawing stone and marble,—being a communication.

1467. Peter Armand Le Comte de Fontainemoreau, of South-street, for an improved process for preserving milk, and its application to several organic products and alimentary substances,—being a communication.

1468. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in the preparation of certain vegetable and alimentary substances,—being a communication.

1469. Clinton Roosevelt, of New York, for an invention for reducing the friction of the journals of railway and other carriages; which is also applicable to the journals of machinery.

1470. Robert Mortimer Glover, of Newcastle-upon-Tyne, for improvements in the production of chlorine, and for the manufacture of black oxide of manganese.

1471. Benjamin Finch, of Dublin, for improvements in apparatus for supplying water to steam-boilers.

1472. Joseph Warren, of Maldon, for improvements in ploughs.

1473. Solomon Solomon, of Aldgate, and Samuel Mills, of St. George's in the East, for improvements in axle-boxes for locomotive engines, railway and other carriages, applicable to the bearings of machinery.

The above bear date June 16*th.*

1474. Edward Rodgers, of Manchester, for an improvement in looms for weaving.

1475. Christopher Waud, Edward Waud, and William Busfield, all of Bradford, Yorkshire, for improvements in preparing wool and other fibrous substances.

1476. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein,—being a communication.

1477. Auguste Edouard Loradoux Bellford, of Castle-street, for an improved stove or kiln.

1478. Robert Lister, of Scotswood, Northumberland, for improvements in chimney tops or flues.

1479. Henry Bleasdale and Joseph Bleasdale, both of Chipping, Lancashire, for improvements in working, tilling, or preparing land.

1481. John Piddington, of Brussels, for improvements in obtain-

ing infusions and decoctions, and in vessels or apparatus employed therein,—being a communication.

The above bear date June 17th.

1482. William Hall, of Aberdeen, for improvements in ship-building.
1483. Henry Bessemer, of St. Pancras-road, for improvements in the manufacture of waterproof, or partially waterproof, fabrics.
1484. Henry Saunders, of Yeovaney Staines, for improvements in drying grass and other crops.
1486. Edgar Breffit, of Castleford, Yorkshire, for improvements in the manufacture of glass-house pots.
1488. Thomas Adamson and William Adamson, of Sunderland, for improvements in pumps.
1489. James Heginbottom and Joseph Heginbottom, of Ovenden, Yorkshire, for improvements in spinning.
1490. James Shanks, of St. Helen's, Lancashire, for improvements in the manufacture of alkali from common salt.
1491. John Moore Hyde, of Bristol, for improvements in steam-engines, and the production of steam for the same.
1492. William Armand Gilbee, of South-street, for a new mode of ornamenting stuffs and paper,—being a communication.
1493. James Worrall, jun., of Salford, for certain improvements in machinery or apparatus for washing, bleaching, and dyeing fustians, beaverteens, cantoons, satteens, twills, and other textile fabrics.
1494. John Cross Richardson, of Lilly-hill, near Manchester, for certain improvements in machinery or apparatus for winding yarn.
1495. John Cross Richardson, of Lilly-hill, near Manchester, for certain improvements in looms for weaving.
1496. George Robinson, of Manchester, for certain improvements in apparatus for roasting and desiccating coffee, cocoa, and chicory.
1497. Samuel Schofield, of Oldham, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.
1498. George Young, of Neath, for improvements in grinding wheat and other grain.

The above bear date June 18th.

1499. Charles Crickmay, of Handsworth, for improvements in the construction of fire-arms.
1500. John Paul, of Manchester, for coloring paper on the surface.
1501. Robert Midgley, of Northowram, Yorkshire, for improvements in preparing and finishing certain worsted yarns, and in apparatus employed therein.
1502. Hiram Barker and Francis Holt, both of Manchester, for improvements in machinery and apparatus for grinding and turning metals.

1503. William Boggett, of St. Martin's-lane, and George Brooks Pettit, of Lisle-street, for improvements in dioptric refractors.

1504. William Hodgson and Henry Hodgson, both of Bradford, Yorkshire, for improvements in machinery for spinning wool, hair, silk, flax, and other fibrous substances.

1505. John William Perkins, of Narrow-street, Limehouse, for improvements in the manufacture of artificial manure.

1506. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for drilling or boring rocks or other hard substances,—being a communication.

1507. William Edward Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of handles for knives and other similar articles,—being a communication.

1508. Charles Louis Defever, of Steenbrugge lez Bruges, Belgium, for an improved preparation for lubricating machinery.

1509. Richard Cornelius, of Old Town-street, Plymouth, for improvements in the construction of churns for producing butter.

1510. Robert Galloway, of Cartmell, Lancashire, for improvements in manufacturing and refining sugar.

1511. Allan Macpherson, of Brussels, for improvements in disinfecting sewers or other drains, and in converting the contents thereof to useful purposes.

1513. Pacifique Grimaud, of Paris, for a new ærogaseous drink, which he calls "grimaudine."

1514. Henry Blatin, of Rue Bonaparte, Paris, for improvements in buckles.

The above bear date June 20th.

1515. Charles Cowper, of Southampton-buildings, for improvements in the manufacture of cards, or substitutes for cards for the Jacquard loom,—being a communication.

1516. Joseph Newton, of Ickwell, Bedfordshire, for improved apparatus for heating buildings; applicable also to horticultural purposes, and to hatching and rearing poultry and game.

1517. Thomas Wilson, of Manchester, for improvements in screens, or machinery for cleaning wheat and other grain.

1518. John Drummond, of Edinburgh, for a reaping machine.

1519. Juste Giret, of Paris, for certain improvements in artificial and malleable stones, and in the apparatus to be used for such purposes.

1520. John Leach, of Over Darwen, for improvements in looms for weaving.

The above bear date June 21st.

1521. John Henry Noone, of Salisbury-street, Portman-market, for an improved method of stopping railway trains, and preventing railway accidents.

1522. Frederick Ayckbourn, of Guildford-street, Russell-square, for improvements in the manufacture of waterproof fabrics.

1523. Francis Huckvale, of Choice-hill, near Chipping Norton, for improvements in hand-hoes.

1524. William Geeves, of New Wharf-road, for improvements in the manufacture of bricks.
1525. Charles Topham, of Hoxton, for improvements in apparatus for measuring liquids, gases, and other elastic fluids, and for regulating the flow thereof; which apparatus may also be applied to the obtaining of motive power.

The above bear date June 22nd.

1526. George Louis Stocks, of Limehouse-hole, and Thomas Watson, of Hoxton, for improvements in the construction of ships' square sails, and in the method of reefing the same.
1527. Noel Natalis du Chastaingt, of Paris, for an improvement in bread making.
1528. James Burrows, of Haigh Foundry, near Wigan, for certain improvements in the construction of steam-boilers or generators, and in the arrangement of furnaces connected therewith.
1529. James Burrows, of Haigh Foundry, near Wigan, for certain improvements in the formation of such metallic plates as are required to be conjoined by rivetting or other similar fastening.
1530. Thomas Weatherburn Dodds, of Rotherham, for improvements in the manufacture of files, rasps, and other edge tools usually made of steel.
1532. Joseph Aspinall, of Liverpool, for a self-adjusting stamp,—being a communication.
1533. Masta Joscelin Cooke, of Newcastle-on-Tyne, for an improved mill and apparatus for crushing and grinding bones, grain, and other compounds.

The above bear date June 23rd.

1534. Joshua Horton, jun., of Staffordshire, for an improvement or improvements in steam-boilers.
1535. Joseph Rock, jun., of Birmingham, for an improvement or improvements in spring or clasp-knives; applicable to such other articles as shut or close after the manner of clasp-knives.
1536. Noble Carr Richardson, of South Shields, for an improved capstan.
1537. George Sands Sidney, of Brixton-road, for improvements in jugs or vessels for containing liquids.
1538. John Webster, of Ipswich, for improvements in the distillation of fatty and oily matters.
1540. John Henry Johnson, of Lincoln's-inn-fields, for improvements in obtaining motive power,—being a communication.
1541. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the production or manufacture of flour,—being a communication.
1542. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for cutting paper and similar materials,—being a communication.

1543. James Mc Connell, of Hazeldean, for improvements in the consumption or prevention of smoke.

1544. John Lyle, of Glasgow, for improvements in the manufacture of figured or ornamental fabrics.

1545. Henry Goodall, of Derby, for improved machinery or apparatus for grinding or levigating various substances.

1546. Leon Valls, of Paris, for improvements in the production of printing surfaces,—being a communication.

The above bear date June 24th.

1547. Daniel Illingworth, Alfred Illingworth, and Henry Illingworth, of Bradford, Yorkshire, for improvements in machinery or apparatus for combing wool, cotton, flax, silk, and other fibrous substances.

1549. John Emanuel Lightfoot, of Accrington, for an improvement in the manufacture of certain coloring matter to be used in dyeing and printing.

1550. George Josiah Mackelcan, of Lechlade, Gloucestershire, for improvements in winnowing or corn dressing machines.

1551. Alfred Sandoz, of Ponts, Switzerland, for an instrument or apparatus which he terms a solar watch,—a communication.

The above bear date June 25th.

1552. Robert Harlow, of Stockport, for improvements in constructing and working valves for baths, washstands, and other purposes.

1553. Richard Archibald Brooman, of Fleet-street, for improvements in printing or in producing designs and patterns on stuffs and fabrics,—being a communication.

1554. William Fairclough, of Stockport, for certain improvements in looms for weaving.

1555. John Mason, of Rochdale, and Luke Ryder, of the same place, for improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.

1556. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improved apparatus for manufacturing rosin oil,—being a communication.

1557. George French, of Bandon, Ireland, for improvements in axles or axletrees.

The above bear date June 27th.

1558. John Jarman, of Manchester, for improvements in apparatus for measuring corn, pulse, seeds, or other produce, usually sold by dry measure.

1559. Carlo Minasi, of Camden Town, for improvements in concertinas.

1560. Alexander Brown, of Glasgow, for improvements in the manufacture of cotton fabrics for ladies' under dresses.

1561. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in steam-boilers,—being a communication.

1562. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in magneto-electric machines,—a communication.
1563. John Henry Johnson, of Lincoln's-inn-fields, for improvements in turning over the leaves of books, music, and engravings, and in the apparatus for effecting the same,—being a communication.

The above bear date June 28th.

1564. Thomas Edward Irons, of Arbroath, for improvements in the manufacture of lasts, and in machinery connected therewith; parts of which machinery are also applicable to other like purposes of eccentric turning.
1565. Frederick Steiner, of Hyndburn, near Accrington, for improvements in the manufacture of wooden rollers or cylinders.
1566. Peter Armand le Comte de Fontainemoreau, of South-street, for improvements in the construction of furnaces,—being a communication.
1567. John Patterson, of Beverley, Yorkshire, for improvements in machines for reaping and mowing corn, grass, and other crops.
1568. Robert Moore Sievier, of Louviers, France, for improvements in the manufacture of piled fabrics, and in machinery for effecting the same.
1570. George Arthur Biddell, of Ipswich, for improvements in apparatus for cutting vegetable and other substances.
1571. Pierre Amable de Saint Simon Sicard, of Paris, for improvements in apparatus for facilitating the raising, moving, and breaking up of sunken vessels and other submerged substances.
1572. James Tatlow, of Wirksworth, Derbyshire, and Henry Hodgkinson, of the same place, for improvements in small-ware looms.
1573. Lemuel Wellman Wright, of Chalford, Gloucestershire, for improvements in the permanent way of railways.

The above bear date June 29th.

1574. Elias Robison Handcock, of Pall Mall, for certain improvements in mechanism to decrease friction in propelling machinery, and to compensate for the wear thereof, and to strengthen the driving parts.
1575. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in the construction of submarine or subaqueous tunnels or ways,—being a communication.
1576. Williams Rice, of Boston, Lincolnshire, for improvements in harness for horses and other animals, and in the manufacture of springs for the same.
1577. Joseph Webb, of Dalston, for improvements in obtaining and applying motive power.
1578. George Sterry, of Worcester, for an improved method of producing designs and patterns in wood.

1579. Andrew Peddie How, of Mark-lane, for an engine meter or instrument for indicating the number of strokes of an engine,—being a communication.

1580. Edward Davies, of Gothenburg, Sweden, for improvements in machinery or apparatus for carding and otherwise preparing cotton or other fibrous materials to be spun, and also for cleaning or stripping cards used in the said operations.

1581. William Charles Spooner, of Eling House, near Southampton, for improvements in drills for agricultural purposes.

1582. William Tasker, of the Waterloo Works, near Andover, for improvements in drills for agricultural purposes.

The above bear date June 30th.

1583. Richard Bradley and William Craven, of Wakefield, for improvements in the moulding, forming, and compressing of clay for the manufacture of bricks, tiles, and other earthenware.

1584. Philip Hart, of Stafford, for improvements in the manufacture of coke.

1586. George Parsons, of West Lambrook, for improved machinery for thrashing, winnowing, and dressing corn, grain, and seeds.

1587. Edward Clarence Shepard, of Trafalgar-square, for improvements in magneto-electric apparatus, suitable for the production of motive power of heat and of light,—being a communication.

The above bear date July 1st.

1588. John Rollinson, of Kingswinford, and William Rollinson, of Brierley-hill, for a new or improved apparatus for preventing explosions in steam-boilers.

1590. Lemuel Wellman Wright, of Chalford, for improvements in machinery or apparatuses for reducing and pulverizing gold and other metalliferous quartz and earths, and in separating metal therefrom.

1591. Edward Clarence Shepard, of Trafalgar-square, for improvements in the manufacture of gas,—a communication.

1592. Richard Archibald Brooman, of Fleet-street, for certain machinery for converting caoutchouc into circular blocks or cylinders, and for manufacturing the same into sheets,—being a communication.

1593. Richard Archibald Brooman, of Fleet-street, for improvements in impregnating, saturating, or coating threads, yarns, and fabrics with metal, which process the inventor terms metallic dyeing,—being a communication.

The above bear date July 2nd.

1594. Charles De Bergue, of Dowgate-hill, for improvements in the manufacture of railway wheels.

1595. Gabriel Didier Fevre, of Paris, for an improved vessel to be used for the purposes of infusion and decoction, heating liquids, and melting glutinous substances.

1597. George Frederick Parratt, of Piccadilly, for improvements in portable bridges, rafts, or pontoons.

The above bear date July 4th.

1598. Henry Meyer, of Manchester, for certain improvements in looms for weaving.

1599. Marcus Davis, of Gray's-inn-lane, for improvements in carriages, scaffoldings, and ladders; which scaffoldings and ladders are used as carriages.

1600. Decimus Julius Tripe, of Commercial-road East, for improvements in locks.

1601. John Fall, of Chorlton-upon-Medlock, for improvements in the treatment of certain oils.

1602. Nathan Pollard, of Bowling, Yorkshire, for an improvement in machinery for drawing wool and other staple.

1603. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improved machinery for printing,—a communication.

1604. George Mackay, of Buckingham-street, Strand, for improvements in the manufacture of glass,—a communication.

1605. Moses Poole, of Avenue-road, Regent's Park, for an improved quartz-crushing, pulverizing, and amalgamating machine,—being a communication.

1606. George Arthur Biddell, of Ipswich, for improvements in apparatus for crushing grain, seeds, or pulse.

The above bear date July 5th.

1607. Thomas Newey, of Garbett-street, Birmingham, for improvements in fastenings for wearing apparel.

1608. Peter Erard, of Marseilles, for certain improvements in steam boilers.

1609. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in typographical printing presses,—being a communcation.

1610. John Hood, of Glasgow, and William Hood, of the same place, for improvements in the treatment or manufacture of ornamental fabrics.

1612. Peter Gaskell, of Manchester, for improvements in elastic springs.

1613. Thomas William Kennard, of Duke-street, Adelphi, for improvements in iron bridges.

1614. James Bradshaw and Thomas Dawson, of Blackburn, for an improved shuttle skewer.

1615. Robert Anderson Rüst, of Regent-street, for an improvement in piano-fortes.

1616. John Woodward, of Platt-street, Middlesex, for an apparatus for curling hair.

1617. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improvements in locks and latches,—being a communication.

The above bear date July 6th.

1618. Henry Bate, of New Hampstead-road, Kentish Town, for a new fire escape, which he denominates the 'Ignevador.'

1619. James Cheetham the younger, of Manchester, for improvements in machinery for cutting fustians, velvets, and other similar fabrics,—being a communication.

1620. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in logs for indicating the speed of ships and other vessels,—being a communication.

1621. Alexander Angus Croll, of Howrah House, East India-road, for improvements in apparatus used in the manufacture of gas.

1622. Christopher Vaux, of Brixton, for improvements in floating breakwaters.

1623. John Knox Stuart, of Glasgow, for improvements in hats and other coverings for the head.

The above bear date July 7th.

1624. Benjamin Dangerfield, and Benjamin Dangerfield, junior, both of West Bromwich, for improvements in constructing and fixing the rails of railways.

1625. Louis Cornides, of Trafalgar-square, for improvements in treating certain ores and minerals, for the purpose of obtaining products therefrom.

1626. William Marsden, junior, of Longridge, Lancashire, and Samuel Roscow, of the same place, for certain improvements in looms for weaving.

1627. William Maddick, of Manchester, for an improved mode of treating madder and munjeet, by which the quality of the colouring matter contained in those substances is greatly improved and its application to dyeing and printing much facilitated.

1628. William Robertson, of Rochdale, for improvements in machinery or apparatus for preparing, spinning, and doubling cotton, wool, and other fibrous substances.

1629. Jacob Brett, of Hanover-square, for improvements in photography.

1630. Louis Brunier, of Norfolk-street, Strand, for improvements in obtaining power by compressed air.

1631. Stephen Martin Saxby, of Brussels, for improvements in apparatus for lowering ships' boats, and for holding and letting go tackle.

1632. Moses Poole, of the Avenue-road, Regent's-park, for improvements in the manufacture of printing rollers.

1633. Philippe Poirier de St. Charles, of Fulham, engineer, for improvements in apparatus for measuring and indicating the distance travelled by cabs and other vehicles.

The above bear date July 8th.

1635. Thomas Restell, of the Strand, for improvements in walking stick umbrellas, applicable also to parasols.

1636. Ewald Riepe, of Finsbury-square, for improvements in the manufacture of turret or clock tower and such like bells,—being a communication.

1637. Ewald Riepe, of Finsbury-square, for improvements in moulds for steel castings,—being a communication.

1638. Henry Hoskyn Peppin, of New Bond-street, for an improved joint for umbrella and parasol sticks,—being a communication.

1639. Jean Theodore Boulé, and François Cailland, both of Paris, for improvements in composing and distributing type.

1640. Frederick Meyer, of Paradise-street, Lambeth, for improvements in the manufacture of candles and night lights.

1641. Pierre Auguste Tourniere, of Laurie-terrace, St. George's-road, and Louis Nicolas De Meckenheim, of Birmingham, for improvements in the manufacture of soap and washing paste, and of the materials used therein.

1642. Mark Sprot, junior, of Garnkirk, Lanark, North Britain, and Robert Denholm, of the same place, for improvements in the manufacture of pipes or hollow articles from plastic materials.

1643. George Pearson Renshaw, of Nottingham, for improvements in cutting and shaping.

1644. William Skinner, junior, of Glasgow, for improvements in windows, shutters, and apparatus connected therewith.

The above bear date July 9th.

1646. Peter Fairbairn, of Leeds, for improved machinery for heckling flax, hemp, China-grass, and other fibrous materials.

1648. Fabian Wrede, of Stockholm, for improvements in gas and air engines.

1650. George Dalton, of Lymington, for improvements in reverberatory and other furnaces.

The above bear date July 11th.

1652. Joseph Bacon Finnemore, of Easy-row, Birmingham, for improvements in sofa springs, useful for spring-stuffed upholstery work generally, and in the adaptation thereof to mattresses.

1654. Patrick Cowan, of Skinner-street, for improvements in gas fittings.

1656. Andrew Burns, of Glasgow, for improvements in constructing iron ships, boats, boilers, and other metallic structures.

1658. James Fletcher, of Facit, near Rochdale, for certain improvements in machinery used for spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.

1660. Nesserwanjee Ardaseer, of Bombay, for a method of driving shafting so as to obtain two revolutions of a screw or other shaft to one revolution of a driving shaft, or to obtain the converse result.

The above bear date July 12th.

1670. The Honorable Sir Richard Broun, Bart., of Sphinx Lodge, Chelsea, for improvements in coffins, catacombs, sarcophaguses, and cenotaphs.

1674. André Louis Jules Le Chevalier St. André, of Albany-street, Regent's-park, for certain improvements in packing goods so as to increase the facility and safety of their transmission from place to place.

The above bear date July 14th.

List of Patents

Granted for SCOTLAND, from the 22nd June to the 22nd July, 1853.

To William Herbert Gossage, late of Stoke Prior, in the county of Worcester, chemist, but now of Howden, in the county of Northumberland, for improvements in obtaining certain metals from some compounds containing such metals; and in obtaining other products by the use of certain compounds containing metals.—Sealed 20th July, 1853.

New Patents.

Sealed under Patent Law Amendment Act, 1852.

955. William Keates, of Liverpool, for improvements in fire-boxes for locomotive and other steam-boilers.—December 3.

1165. William Tuer, William Hodgson, and Robert Hall, of Bury, for improvements in the manufacture of textile fabrics, and in machinery or apparatus for weaving; part of which is also applicable to machinery for preparing textile materials.—Dec. 24.

1173. James Darling, of Manchester, and Henry Spencer, of Rochdale, for improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.—December 28.

1174. William Beckett Johnson, of Manchester, for improvements in steam-boilers and in apparatus connected therewith.—December 28.

1175. Pierre François Giraud, of Paris, for an apparatus for the interior of bonnets, to fix them on the head.—December 28.

1177. Edward Mucklow, of Bury, for certain improvements in the construction of retorts for the manufacture of pyroligneous acid, or for other purposes of destructive distillation.—Dec. 28.

1178. Edward Mucklow, of Bury, for certain improvements in machinery or apparatus for cutting or rasping dye woods.—December 28.

1853.

7. Joseph Brough, of Longton, Staffordshire, for a new manufacture of a vitrified substance, and its application, alone or in combination with mineral, earthy, and plastic substances, to various useful purposes in the arts; and for certain other new applications of known plastic substances.—January 1.

9. Matthew Tomlinson, of Hulme, Manchester, for certain improvements in the manufacture of "species jars," or show-jars.—January 1.

10. David Hulett, of High Holborn, for improvements in the manufacture of ornaments for lamps, chandeliers, and architectural purposes.—January 3.

16. Edward Clarence Shepard, of Duke-street, Westminster, for improvements in the manufacture of gas.—January 4.

17. Joseph James Welch, and John Stewart Margetson, of Cheapside, for certain improvements in the manufacture of travelling-cases, wrappers, and certain articles of dress hitherto manufactured of leather.—January 4.

19. George Gwynne, of Hyde-park-square, and George Fergusson Wilson, of Belmont, Vauxhall, for improvements in treating fatty and oily matters.—January 4.

20. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in atmospheric engines,—being a communication.—January 5.

21. Jean Baptiste Pascal, of Lyons, for improvements in obtaining motive power.—January 5.

23. Gustave Paul de L'Huynes, of Frith-street, Soho-square, for improvements in medical portative electro galvanic apparatus.—January 5.

24. Thomas Shilton, of Baddesley, Ensor, Warwickshire, for certain improvements in weighing machines.—January 5.

25. Charles Frederick Whitworth, of Brighton, for improvements in apparatus to be used in connection with railway signals for the purpose of indicating the approach of trains and of preventing collisions.—January 5.

26. Francis Edwards, of Park-place, Toxteth-park, near Liverpool, for improvements in the method of lettering, figuring, and ornamenting the surface of enamel used for dials and other purposes.—January 5.

28. Herbert Newton Penrice, of Sheffield, for improvements in propelling vessels.—January 5.

30. Emille Grillet, of Soho-square, Gent., for improvements in renewing the teeth of files.—January 6.

36. Robert Whinery, of Liverpool, for certain improvements in or upon the manufacture and treatment of leather, either alone or in combination with other materials.—January 6.

42. William Sykes Ward, of Leeds, for a thermostat, or apparatus for the regulation of temperature and of ventilation.—Jan. 6.

43. William Watson, the younger, of Leeds, for improvements in

apparatus for the manufacturing of prussiate of potash.—January 6.

45. Thomas Pape, of Loughborough, for improvements in circular frames and in the fabrics and articles produced thereon.—Jan. 7.

55. John Abraham, of Birmingham, for a new or improved method of manufacturing percussion caps.—January 8.

62. Charles Stewart Duncan, of Charing-cross, for certain improvements in rendering bottles, jars, and other like receptacles, air and water tight, and for raising and measuring the liquid contents thereof.—January 10.

63. John Deane, of Whitstable, for an improved construction of diving helmet.—January 10.

65. William Webb, of Princes-street, Spitalfields, for improvements in the manufacture of carpets.—January 10.

67. Frederick Schneider, of Berne, Switzerland, for a chair to be employed for preventing sea sickness.—January 10.

68. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved mode of separating substances of different specific gravities,—being a communication.—January 10.

70. William Weild, of Manchester, for certain improvements in looms for weaving.—January 11.

75. John Petrie, jun., of Rochdale, and Samuel Taylor, of the same place, for improvements in machinery or apparatus for washing or scouring wool.—January 11.

78. Nathaniel Card, of Manchester, for certain improvements in candle-wick.—January 12.

80. James Fletcher, of Facit, near Rochdale, for certain improvements in machinery applicable to spinning, doubling, and winding of cotton, wool, flax, silk, and other fibrous materials.—January 12.

82. John Arrowsmith, of Bilston, for new or improved machinery for shaping metals.—January 12.

87. John Capper, of Earl's-court, Old Brompton, and Thomas John Watson, of Devonshire-terrace, Fulham-road, for improvements in preparing and bleaching jute and other vegetable fibres.—January 12.

88. Frederick Lawrence and Alfred Lawrence, of Pitfield-street, Old-street-road, for improvements in sluices and lock gates.—January 12.

90. Moses Cartwright, of Longton, Stafford, for an improvement or improvements in the preparation or manufacture of gypsum or plaster of Paris.—January 13.

91. Charles Bullivant, of Birmingham, and Charles Hackney, of Balsall Heath, near Birmingham, for an improvement or improvements in certain kinds of spoons and ladles.—January 13.

93. John Rumley, of South Shields, for certain improvements in pumps.—January 13.

99. Arthur James, of Redditch, Worcestershire, for improvements in means of enclosing needles.—January 14.

105. Edward Tasker, of South Hackney, for an invention for the purposes of writing and drawing, called "the writing and drawing tube."—January 15.

107. James Hadden Young, of College-street, Camden Town, for improvements in brooms or brushing apparatus.—January 15.

109. John Arrowsmith, of Bilston, for certain new or improved pumping machinery.—January 15.

110. Thomas Potts, and James Septimus Cockings, both of Birmingham, for improvements in the manufacture of tubes, and in the application of tubes to certain purposes.—January 17.

113. William Nairne, of Perth, for improvements in power looms. —January 17.

114. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in the manufacture of batting or wadding,—being a communication.—January 17.

115. Auguste Loradoux Bellford, of Castle-street, Holborn, for improvements in the manufacture of blocks for printing music, —being a communication.—January 17.

120. John Thornborrow Manifold, and Charles Spencer Lowndes, of Liverpool, for improvements in steam-engines.—January 18.

124. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved sewing machine,—being a communication.—January 18.

128. Robert Neale, of Cumming-street, Pentonville, for improvements in the process of copper and other plate and cylinder printing, and inking, and wiping, and polishing by machinery the engraved plates and cylinders whilst used in the process. —January 18.

136. Joseph Maudslay, of Lambeth, for improvements in steam-engines; which are also applicable wholly or in part to pumps and other motive machines.—January 19.

140. Cornelius Ward, of Great Titchfield-street, for a new construction of the musical instrument designated the bassoon.— January 20.

141. Cornelius Ward, of Great Titchfield-street, for combining the musical instruments designated the drum and the cymbals, in such manner as to make them as one instrument; which instrument he terms the "cymbal drum."—January 20.

147. William Williams, of Eccleshall, for improvements in refrigerating apparatus.—January 20.

148. George Carter, of Eltham, for improvements in the construction of furnaces.—January 21.

170. Arthur Wellington Callen, of Peckham, and Abraham Ripley, of Westminster-road, for an improvement in the modes of giving and transmitting multiplying rotative motion to shafts and other revolving bodies.—January 22.

175. Donald Beatson, of Mile End, for improvements in the means of propelling ships and other floating vessels.—Jan. 24.

176. William Nairne, of Perth, for improvements in dressing yarns for looms.—January 24.
178. William Kendall, of Blawith, near Ulverston, for improvements in the manufacture of boxes and similar articles, and in the machinery or apparatus to be employed therein.—Jan. 24.
180. John Stevenson, of Dungannon, for improvements in machinery for spinning flax and tow.—January 24.
185. William Thomas Henley, of St. John-street-road, for improvements in covering, laying, and uniting wires and ropes for telegraphic purposes, and in the machinery employed therein.—January 25.
197. Nicolas Francisque Ador, of Castle-street, Holborn, for improvements in preparing plastic materials, to be used in the manufacture of fired wares, and for other purposes.—Jan. 26.
210. Robert Shaw, of Portlaw, for starting, stopping, and reversing steam-engines.—January 28.
215. Joseph Scott, of Glasgow, for improvements in closing or stoppering bottles, jars, and other receptacles.—January 28.
225. William Archer, of Hampton Court, for an improved mode or modes of preventing accidents, by improved signals, on railways,—parts of which improvements are applicable to blast-furnaces.—January 29.
229. Francis Whishaw, of John-street, Adelphi, for an improved lock or system of locks.—January 29.
233. Marcus Spring, of Church-row, Hampstead, for improvement in apparatus for separating gold from matter mixed or combined therewith,—being a communication.—January 29.
239. William Constable, of Brighton, for improvements in transmitting motive power to machinery, and in regulating the action of rotary machines.—January 29.
251. Louis Guillaume Perreaux, of Paris, for improvements in machinery or apparatus for testing and ascertaining the strength of yarn, thread, wire, strings, or fabrics.—January 31.
252. Edwin Pugh, of Whitstable, for improvements in the means of ballasting ships or vessels, and in rendering them buoyant under certain circumstances.—January 31.
253. John Mason, of Rochdale, for improvements in looms for weaving.—January 31.
256. David Chalmers, of Manchester, for improvements in looms.—January 31.
258. Frederick Lawrence, of Pitfield-street, William Davison, of Halstead, and Alfred Lawrence, of Pitfield-street, for improvements in engines to be worked by steam or other fluid.—January 31.
286. Owen Williams, of Stratford, for improvements in water-closets.—February 2.
312. George Letts, of Northampton, for improvements in machines for cutting and mincing meat and other materials for sausages and other like purposes, and for filling the prepared skins with the meat and other materials when so cut.—Feb. 4.

316. Richard Prosser, of Birmingham, for improvements in the construction of printing rollers used in machines for printing calicoes and other substances.—February 5.

347. Isaiah James Machin, of Leigh-street, for an improvement in nut-crackers.—February 9.

361. Charles Breese, of Birmingham, for improvements in ornamenting papier-maché, japanned iron, china, and other hard or bright surfaces with gold.—February 10.

374. George Henry Bursill, of Offord-road, Barnsbury Park, for improvements in operating upon auriferous quartz, clays, and other minerals, preparatory to and in order to accomplish the separation of the gold and other metals; also in machinery or apparatus for effecting such improvements.—February 12.

394. Adolphe Nicole, of Dean-street, for improvements in rotary engines.—February 15.

397. Joseph and Alfred Ridsdale, of the Minories, for improvements in ships' side-lights, scuttles, or ports.—February 15.

421. Charles Watt, of Selwood-place, Brompton, and Hugh Burgess, of Grove-terrace, Kentish Town, for improvements in coating iron with copper and brass.—February 17.

447. John Charles Pearce, of the Bowling Iron Works, near Bradford, for improvements in steam-boilers.—February 21.

460. Samuel Cunliffe Lister, of Bradford, for improvements in treating soap-suds.—February 23.

467. William Johnson, of Lincoln's-inn-Fields, for improvements in the treatment or manufacture of caoutchouc,—being a communication.—February 24.

472. Thomas Browne Jordan, of New Cross, for improvements in machinery for planing slate.—February 24.

481. Antonio Fedele Cossus, of University-street, for improvements in filters.—February 25.

531. Charles Humpage, of King's Norton, Worcester, for the application of certain materials to the manufacture of coffin furniture.—March 3.

541. John Wright, of Camberwell, for improvements in machinery for manufacturing bags or envelopes of paper, calico, or textile fabrics.—March 3.

581. Jacques Francisque Pinel, of Pall Mall, for improvements in deodorizing sewage water and cesspools, and in manufacturing manures.—March 8.

582. Nicolas Schmitt, of Goffontaine, Prussia, for improvements in cleansing and separating ores and coal.—March 8.

602. Edward Maitland Stapley, of Lawrence-lane, for improvements in machinery for breaking and dressing flax and other fibrous materials,—being a communication.—March 9.

639. John Scott, jun., of Greenock, for improvements in the treatment or manufacture of animal charcoal.—March 14.

712. Charles William Siemens, of Adelphi-terrace, and Joseph Adamson, of Leeds, for improvements in rotatory fluid meters. —March 24.

713. John Beaumont, of Dalton, near Huddersfield, for a new manufacture of certain descriptions of woven fabrics.—Mar. 24.
721. William Mc Naught, of Rochdale, for certain improvements in steam-engines.—March 24.
734. John George Truscott Campbell, of Lambeth-hill, Upper Thames-street, for certain improvements in ships' propellers. —March 28.
738. John Scott, jun., and George William Jaffrey, both of Greenock, for improvements in steam-engines.—March 28.
765. John Carter Ramsden, of Bradford, for improvements in looms for weaving.—March 30.
809. William Wilcocks Sleigh, of London, for the production of motive power, which he entitles the counteracting reaction motive power engine.—April 5.
812. George Purcell, of Cork, for a new method of adjustment in the art of printing, by means of certain combinations of various sized spaces and quadrats.—April 5.
820. John Thomas, of Caen, for improvements in apparatus for the manufacture of gas and coke.—April 5.
837. Edward Langdon Bryan, of Hoxton, for improvements in warming and ventilating rooms and buildings.—April 7.
838. Colin Mather, of Salford, for improvements in power looms. —April 7.
839. Robert Pattison Clark, of Lambton Collieries, for improvements in machinery for loading and unloading colliers, and other ships and vessels.—April 7.
840. Frederick Le Mesurier, of Pau, France, for improvements in apparatus for measuring and indicating a given period of time.—April 7.
841. Leopold Joseph Green, of Leatherhead, Surrey, for improvements in axletree boxes.—April 7.
842. Christopher Nickels, of York-road, for improvements in machinery for masticating, kneading, or grinding India-rubber, gutta-percha, and other matters.—April 7.
848. Alexander Samuel Braden, of High-street, Islington, for improvements in apparatus for roasting coffee, cocoa, and other vegetable matters, and for cooling the same when roasted.—April 8.
851. Henry Oliver Robinson, of Moorgate-street, for improvements in machinery for crushing sugar canes.—April 8.
852. George Herbert, of Summer-hill, Dartford, for improvements in constructing and mooring light vessels, buoys, and other similar floating bodies.—April 8.
857. Herbert Taylor, of Mark-lane, for improvements in ornamenting surfaces or fabrics applicable to various useful purposes, such as for covers of furniture, imitation tapestry, carpets or hangings,—being a communication.—April 9.
858. Adolphe Marius Alexandre Iglesia, of Russell-place, Fitzroy-square, for improvements in producing ornamental glass surfaces.—April 9.

859. William Penn Cresson, of Philadelphia, for improvements in lathes, and parts connected therewith, for the purpose of reducing and smoothing the surfaces of certain metal wares,—being a communication.—April 9.

874. Henry William Harman, of Northfleet Dockyard, for improvements in steam-engines.—April 12.

877. Downes Edwards, of Ravenscliffe, for improvements in signal apparatus for railways.—April 12.

878. Thomas Greenwood, of Little Alie-street, for improvements in evaporating saccharine fluids.—April 12.

880. François Felix Verdié, of Lorette, Loire, France, for certain improvements in welding cast steel with iron, steel, cast-iron, and other metals.—April 12.

883. John Smith, of Bartholomew-close, for an improved mode of suspending carriage bodies.—April 12.

884. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improvements in steam boilers, and in the mode of supplying the same with water,—a communication.—April 12.

886. Nathaniel Clayton and Joseph Shuttleworth, of Stamp End Ironworks, Lincoln, for an improvement in portable and locomotive steam-engines.—April 13.

887. George Elliot and William Russell, both of St. Helen's, Lancashire, for improvements in the manufacture of alkali.—April 13.

889. Thomas Edwards, of Birmingham, for improvements in steam-engines.—April 13.

890. James Noble, of Leeds, for improvements in preparing cotton and other fibres.—April 13.

891. Douglas Hebson, of Dale-street, Liverpool, for improvements in working the air-pumps of steam-engines.—April 13.

894. James Noble, of Leeds, for improvements in preparing cotton and other fibres.—April 13.

896. John Hinks and George Wells, of Birmingham, for an improvement or improvements in certain kinds of boxes.—Apr 14.

897. Thomas Lovell Preston, of Birmingham, for an improvement or improvements in cutting out and piercing metals.—April 14.

898. Moses Robinson, of Brussels, for certain improved means for preventing accidents on railways.—April 14.

900. Charles Lowe, of Sheepy Hall, Leicester, for improvements in mills for grinding wheat and other grain.—April 14.

906. John Wallace Duncan, of Grove-end-road, St. John's Wood, for certain new combinations of gutta-percha with other materials, and the method of applying such for use.—April 14.

908. Charles Green and James Newman, of Birmingham, for improvements in the manufacture of wheels.—April 14.

909. Robert Wyburn, of Taunton, for improvements in the construction of easy chairs.—April 14.

910. William Ogden, of Oldham, for a certain improvement or

improvements applicable to carding-engines, used for carding cotton, wool, and other fibrous materials.—April 14.

911. William John Thomas Jones, of Palace-street, Pimlico, for improvements in steam-engine governors.—April 14.

912. David Zenner, of Newcastle-upon-Tyne, for improvements in the treatment of ores and other substances containing metals, to obtain products therefrom, and the apparatus used therein.—April 14.

913. Alexander Crichton, of Saint George's-terrace, Park-road, Liverpool, for improvements in the fitting of bilge-pumps and injection-cocks of iron steamers and sailing vessels.—April 14.

917. William Wilkinson, of Nottingham, for an improvement or improvements in ropes, cords, lines, twines, and mill-bandings. —April 15.

923. Joseph Dunning, of Regent-street, for an improvement in the construction of coke ovens.—April 16.

929. William Walker Stephens, of Edinburgh, for the application of retorts in gas ovens, or other ovens, and of gas ovens or other ovens which are constructed as retorts, to the process of improving iron, and converting iron into steel.—April 18.

941. Lambert Adolph Beauvain, of Upper Charlotte-street, Fitzroy-square, for improvements in machinery for obtaining wool, silk, and fibres from fabrics, and rendering them suitable to be again employed.—April 19.

942. John Chatterton, of Birmingham, for improvements in coating tubes.—April 19.

943. Frederick Henry Smith, of Southwark, for improvements in apparatus for cleansing the interior of tubular boilers and other hollow articles.—April 19.

944. John Fuller, of Thomas-place, Kennington, for improvements in galvanic batteries.—April 19.

945. Christian Böhringer and Gustavus Clemm, of Wohlgelen, near Mannheim, for improvements in the manufacture of soda and potash.—April 19.

947. Edward Vivian, of Torquay, for improvements in cases for containing hats in churches and similar situations.—April 19.

957. Sir William Snow Harris, of Plymouth, for improvements in lightning conductors for ships and vessels.—April 20.

961. Juan Duran, of Madrid, for obtaining and applying motive power.—April 21.

962. Henry Carr, of East Retford, Nottingham, for certain improvements in the construction of railways,—April 21.

966. William H. Johnson, of Granville, Hampden, Massachusetts, for sewing cloth, leather, and other materials.—April 21.

967. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improvements in machinery for bending wood or other materials,—being a communication.—April 21.

969. James Davis, of Hemel Hempstead, for improvements in the manufacture of thrashing machines.—April 22.

970. William Sager, of Seacomb, for certain improvements in machinery or apparatus for propelling vessels.—April 22.

974. Cyprien Marie Tessie du Motay, of Paris, for improvements in preparing oils, and in apparatus for burning the same.—April 22.

983. William Johnson, of Lincoln's-inn-fields, for improvements in machinery for combing wool or other fibrous materials,—being a communication.—April 23.

984. James Napier, of Partick, Lanark, for improvements in separating certain metals from their ores and alloys, and for obtaining certain products therefrom.—April 23.

985. George Fergusson Wilson, of Belmont, Vauxhall, William Henry Hatcher, of Mann-street, Old Kent-road, and John Jackson, of Southville, Wandsworth-road, for improvements in apparatus for manufacturing moulded candles.—April 23.

996. Isaac Brentnall Sheath, of Birmingham, for certain improvements in fire-arms.—April 26.

997. Jacques Emile Joffriaud, of Paris, for certain improvements in machinery or apparatus for washing earths containing gold, extracted from the bottoms of rivers or other waters.—Apr 26.

1003. Uriah Scott, of Grove-street, Camden Town, for improvements in the manufacture of tubular rods and rings for furniture.—April 26.

1004. Moses Poole, of Avenue-road, Regent's-park, for improvements in the manufacture of porcelain and like wares,—being a communication.—April 26.

1007. George Ferdinand de Fonveille, of Marseilles, for a filtering machine, which acts under water, and is applicable to the filtering of all liquids.—April 27.

1010. John Hetherington, of Manchester, and John Dugdale, the younger, and Edward Dugdale, both of Blackburn, for improvements in constructing and applying models or patterns for moulding, preparatory to casting iron, brass, and other metals, for various purposes.—April 27.

1016. George Turner, of Bradley-terrace, Wandsworth-road, and Robert Holloway, of St. James-street, Old Kent-road, for improvements in the manufacture of unfermented bread, which improvements are also applicable to other purposes as a substitute for yeast.—April 27.

1017. George Critchley, of Cheltenham, for an improved apparatus for regulating the heat and supply of water in hot-water apparatus.—April 27.

1024. Richard Jordan Gatling, of Indianopolis, United States of America, for distributing power to machine shops, factories, and other places.—April 27.

1026. William Frederick Thomas, of Porchester-terrace, Bayswater, for improvements in apparatus for sewing or stitching.—April 27.

1027. Alfred George Anderson, and John Barker Anderson, both

of Great Suffolk-street, Southwark, for improvements in the treatment of certain saponaceous compounds obtained in the manufacture of soap.—April 27.

1029. John Hetherington, of Manchester, for certain improvements in machinery for combing cotton, wool, silk waste, flax, tow, and other fibrous substances.—April 28.

1032. Peter Fairbairn, of Leeds, and Ferdinand Kaselowsky, of Berlin, for improvements in machinery for drawing, roving, and spinning flax, hemp, and other fibrous substances.—April 28.

1036. Thomas Revis, of Stockwell, for improved single seed drilling or dibbling machinery.—April 28.

1040. Robert Davison, of Mark-lane, London, and James Scott Horrocks, of Heaton Norris, for certain improvements in the means of conveying and distributing, or separating, granular and other substances.—April 29.

1048. John Kealy, of Oxford-street, for improvements in machinery for mowing.—April 29.

1061. George Murton, of Eagley Mills, near Bolton, and William Hatton Langshaw, of the same place, for certain improvements in stretching, dressing, and finishing cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.—May 2.

1067.—Christian Radunsky, of Cockspur-street, for certain improvements in electro-voltaic apparatus,—a communication.—May 2.

1073. Robert Walter Swinburne, of South Shields, for improvements in the manufacture of glass.—May 3.

1075. Richard Quin, of Rodney-street, Pentonville, for improvements in the manufacture of cases for jewellery, for optical and other instruments, miniatures, and other articles.—May 3.

1078. Louis Cornides, of Trafalgar-square, for improvements in treating certain ores and minerals for the purpose of obtaining products therefrom.—May 3.

1081. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in hot air furnaces for heating buildings; some of which improvements are applicable to other furnaces,—being a communication.—May 3.

1083. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery or apparatus for dressing mill-stones,—being a communication.—May 3.

1084. George Bell, of Inchmichael, Perth, for a new machine for several agricultural purposes.—May 4.

1094. John Scott Russell, of Great George-street, for improvements in marine steam-engines.—May 4.

1095. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in combining India-rubber with certain metals.—May 4.

1096. Thomas Taylor, of the Patent Saw Mills, Manchester, for

improvements in apparatus for measuring and for governing the flow of water and other liquids.—May 4.

1097. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in apparatus for rolling iron,—being a communication.—May 4.

1101. Joseph Dempsey Holdforth, of Leeds, for improvements in machinery for combing or dressing silk and other fibrous substances.—May 5.

1102. Charles Larbaud, of Paris, for a new system of trigger applied to play-arms, such as pistols, fusils, rifles, cannons, and guns.—May 5.

1103. John Rawe, jun., of Lemaile, near Wadebridge, Cornwall, for propelling vessels and other vehicles in the water.—May 5.

1107. John Whiteley, of Stapleford, Nottingham, for improvements in warp-machinery for producing ornamented and textile fabrics.—May 5.

1108. John Hetherington, of Manchester, for improvements in preparing cotton, wool, flax, silk, and other fibrous substances for spinning.—May 5.

1109. Thomas Symes Prideaux, of St. John's Wood, for improvements in propelling vessels.—May 5.

1114. George Dowler, of Birmingham, for improvements in boxes for containing and igniting matches.—May 6.

1115. Augustus Brackenbury, of Camden-town, for improvements in precipitating the muriate of soda from its solutions in water.—May 6.

1121. Christopher Nickels, of York-road, Lambeth, for improvements in machinery for masticating, kneading, or grinding India-rubber, gutta-percha, and other matters.—May 6.

1125. James Nichol, of Edinburgh, for improvements in bookbinding.—May 7.

1127. John Pullman, of Greek-street, Soho, for improvements in the manufacture of losh, or oil-dressed leather.—May 7.

1128. Henry Warner, Joseph Haywood, and William Cross, of Loughborough, for improvements in machinery used in the manufacture of frame-work knitting.—May 7.

1130. William Boggett, of St. Martin's-lane, and George Brooks Pettit, of Lisle-street, for improvements in apparatus for heating by gas.—May 7.

1140. Thomas Quaife, of Battle, for improvements in the manufacture of watches, watch-cases, and in tools and apparatus employed therein.—May 9.

1146. Octavius Henry Smith, of Bedford-square, and Youngs Parfrey, of Pimlico, for improvements in the manufacture of carriage wheels.—May 10.

1147. Robert Brown, of Waterloo-road, Liverpool, for improvements in lifting and forcing water and other fluids.—May 10.

1148. George Tillett, of Kentish Town, for improvements in the manufacture of metal bedsteads.—May 10.

1154. Samuel Russell, of Sheffield, for improvements in handles for razors.—May 11.

1157. Samuel Cunliffe Lister, of Manningham, Yorkshire, for improvements in treating and preparing, before being spun, wool, cotton, and other fibrous materials.—May 11.

1158. John Crabtree, and Thomas Livesey Scott, both of Heywood, for certain improvements in machinery for preparing and spinning cotton and other fibrous substances.—May 11.

1164. William Bradbury and Frederick Mullett Evans, of Whitefriars, for improvements in taking impressions and producing printing surfaces,—being a communication.—May 11.

1175. Joseph Denton, of Prestwich, for improvements in machinery or apparatus for manufacturing looped terry or other similar fabrics.—May 12.

1181. George Bertram, of Edinburgh, for improvements in the manufacture of paper.—May 13.

1182. George Stiff, of Minerva Cottage, Brixton-hill, for an improved construction of printing machine.—May 13.

1183. William Thomas, of Cheapside, for improvements in weaving narrow fabrics for binding.—May 13.

1184. Charles Tetley, of Skinner-street, for improvements in rotary engines.—May 13.

1195. Moses Poole, of Avenue-road, Regent's-park, for a new or improved machine for pegging boots or shoes,—being a communication.—May 14.

1196. Herman Dirs Mertens, of Margate, for improvements in preparing materials to be employed in making beer and other beverages,—being a communication.—May 14.

1199. John O'Keefe, of Queen Ann-street, Liverpool, for improvements in the manufacture of watch-cases.—May 14.

1204. Robert Walter Swinburne, of South Shields, for improvements in apparatus or machinery to be used in the manufacture of glass.—May 14.

1207. Jean Emile Barse, of Paris, for improvements in the manufacture of grease or composition for lubricating the axles and moving parts of machinery.—May 16.

1212. George Jones, of Birmingham, for improvements in ventilating mines.—May 16.

1213. George Berry, of Buttesland-street, Shoreditch, for an improved method of roasting coffee, cocoa, and chicory.—May 17.

1216. Joseph Webb, of Mayfield-terrace, Dalston, for improvements in rotary engines.—May 17.

1225. Charles Clarkson, of Avery-row, Lower Grosvenor-street, for an improved duster or dusting-brush, painting-brush, and all other description of brushes, the handle of which passes through the centre, and the hair or bristles are bound or tied round it.—May 18.

CELESTIAL PHENOMENA FOR AUGUST, 1853.

D.	H.	M.	
1			Clock before the ☉ 6m. 0s.
—			☽ rises 0h. 42m. M.
—			☽ passes mer. 9h. 10m. M.
—			☽ sets 5h. 46m. A.
2	8	39	♃'s second sat. will em.
	22	30	☿ stationary.
4	0	6	Ecliptic conj. or ● new moon
	14	44	♅ in □ with the ☉
5			Clock before the ☉ 5m. 42s.
—			☽ rises 4h. 31m. M.
—			☽ pass mer. 0h. 36m. A.
—			☽ sets 8h. 26m. A.
	18	50	☿ in conj. with the ☽ diff. of dec. 9. 34. S.
6	6	52	♀ in conj. with the ☽ diff. of dec. 3. 48. S.
	8	2	♃'s first sat. will em.
9	11	16	♃'s second sat. will em.
10			Clock before the ☉ 5m. 5s.
—			☽ rises 11h. 0m. M.
—			☽ pass mer. 4h. 36m. A.
—			☽ sets 10h. 0m. A.
11	2	32	♃ stationary.
12	3	39	☽ in □ or first quarter
13	9	57	♃'s first sat. will em.
	10	35	♃ in conj. with the ☽ diff. of dec. 0. 6. N.
14	7		☽ in Perigee
15			Clock before the ☉ 4m. 13s.
—			☽ rises 5h. 37m. A.
—			☽ pass mer. 9h. 18m. A.
—			☽ sets 0h. 2m. M.
	7	51	☿ greatest hel. lat. S.
17			Mercury, R. A., 9h. 45m. dec. 8. 42. N.
—			Venus, R. A., 9h. 1m. dec. 18. 33. N.
—			Mars, R. A., 6h. 32m. dec. 23. 43. N.
—			Vesta, R. A., 8h. 0m. dec. 21. 0. N.
—			Juno, R. A., 8h. 38m. dec. 11. 18. N.
—			Pallas, R. A., 14h. 38m. dec. 15h. 14. S.
17			Ceres, R. A., 14h. 40m. dec. 12. 4. S.
—			Jupiter, R. A., 16h. 53m. dec. 22. 14. S.
—			Saturn, R. A., 3h. 57m. dec. 18. 21. N.
—			Uranus, R. A., 2h. 41m. dec. 15. 13. N.
—			Mercury pass mer. 23h. 55m.
—			Venus pass mer. 1h. 42m.
—			Mars pass mer. 20h. 48m.
—			Jupiter pass mer. 7h. 9m.
—			Saturn pass mer. 18h. 12m.
—			Uranus pass mer. 16h. 51m.
	15	15	☿ in inf. conj. with the ☉
	18		♅ stationary.
18	10	55	Ecliptic oppo. or ○ full moon
20			Clock before the ☉ 3m. 8s.
—			☽ rises 8h. 23m. A.
—			☽ pass mer. 1h. 4m. M.
—			☽ sets 6h. 13m. M.
—			Occul. 30 Piscium, im. 17h. 49m. em. 18h. 4m.
23			Occul. π¹ Ceti, im. 11h. 58m. em. 13h. 6m.
24	6	56	♄ in □ with the ☉
	8	52	♅ in conj. with the ☽ diff. of dec. 2. 33. N.
25			Clock before the ☉ 1m. 52s.
—			☽ rises 9h. 46m. A.
—			☽ passes mer. 4h. 44m. M.
—			☽ sets 0h. 16m. A.
26	0	28	♄ in conj. with the ☽ diff. of dec. 0. 51. S.
	3	38	☽ in □ or last quarter
	12	47	♀ in conj. with γ, Virginis.
	14	0	☽ in Apogee
	15	48	☿ stationary.
28	8	55	♃'s third sat. will em.
29	8	16	♃'s first sat. will em.
29	16	13	♂ in conj. with the ☽ diff. of dec. 1. 49. S.
30			Clock before the ☉ 0h. 26m.
—			☽ rises 0h. 5m. M.
—			☽ passes mer. 8h. 44m. M.
—			☽ sets 5h. 19m. A.

J. LEWTHWAITE, Rotherhithe.

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RECENT PATENTS.

To Lewis Jennings, *of Fludyer-street, mechanical engineer, for an improved construction of lock.*—[Sealed 29th January, 1853.]

This invention relates to a new construction of lock, in which a series of permutation-plates, each pierced with a central hole to receive the key, are arranged within a cylindrical or other case, and furnished with a projection to receive the pressure of the key, and with a recess or recesses in the outer periphery to receive a tumbler, when all of them have been brought round to the proper point. The key is made of a series of plates, corresponding in number with the permutation-plates, and each having a recess, of different length, to act in succession on the permutation-plates, so as to bring them to the proper position for the reception of the tumblers,—one of the series of plates being cam-formed, for the purpose of operating the tumblers.

The permutation-plates and tumbler or tumblers are arranged within a rotary cylinder or other case, surrounded by a permanent flanch or case, properly recessed, for the reception of the tumbler, when held out by the permutation-plates, to prevent the rotating cylinder or case from turning when locked.

Combined with the rotating cylinder or case, which contains the permutation-plates and tumbler, is an excentric, fitted to a yoke on the bolt, for the purpose of throwing the bolt,—the excentric being at the dead point when the bolt is

thrown out; so that any pressure applied directly to the bolt, to force it in, may have no tendency to turn the excentric.

In Plate VI., fig. 1, is a view of the back of the lock; fig. 2, is a front view of the same, with the plate which secures the parts removed; fig. 3, is a transverse section, taken in the line A, B, of fig. 2; and figs. 4, and 5, are two elevations of the key. *a*, represents the lock-case, which may be made of any desired form; and *b*, the main bolt, the rear end of which is formed into a yoke *c*, to embrace an excentric *d*, by the rotation of which the bolt is forced in and out. The excentric is attached to, and made a part of a hollow cylinder *e*, which has its bearings in the lock-case; and its upper end is bored out, to receive the shank *g*, of the key *h*, (see figs. 4, and 5,) and grooved at *i*, to receive a short feather or bit *j*, on the key-stem, by which the cylinder is rotated; but this groove only runs parallel with the axis for a short distance, and then it runs, in the direction of the periphery, for nearly the entire circumference (as shewn by dots in fig. 6,); so that, when the key is inserted, it has to be turned nearly one entire revolution before the cylinder and excentric are acted on to be turned. The form of this groove is shewn by dots in the detached plan view, fig. 6. In this way it will be observed, that when the bolt is thrown out or locked, the excentric is at its dead point, and therefore any pressure applied directly to the bolt, to throw it back, will be effectually resisted, and will not be felt by the permutation-tumblers and plates, to be hereafter described.

On the shank of the key there are arranged a series of key-plates *l*, (see figs. 4, and 5,). These plates (see the detached view, fig. 7,) are pierced with a central hole, and fitted, by a feather, on to a stem *m*, let into a central hole in the shank of the key, and there secured by a screw *n*. A portion *o*, of the periphery of these plates is cut out in the direction of the periphery, all starting from a line *p*, parallel with the axis; but no two of the plates should be cut out to the same distance. The head *q*, of the stem, is of the same diameter as the plates, but of greater thickness; and this is, in like manner, cut or recessed out. The varying length of the portion cut out of each may be governed by the following rule:—In the lock, represented in the figures, there are ten permutation-plates, and therefore ten key-plates, which, with the head *q*, make eleven. The head *q*, is to be cut out to the shortest distance from the line *p*, and then the remaining portion of the circle is to be divided into twelve or more parts; that is, a greater number than the number of plates; and each succeeding plate is to have the portion cut out one division longer

than the preceding one, so that there shall be a space left between the end of the longest recess and the line p. The reason for thus constructing the key will be presently explained.

In the bore of the cylinder e, is fitted a series of permutation-plates r, (fig. 8, and shewn detached in fig. 9,) and equal in number to those of the key. Interposed between every two throughout the series of the permutation-plates is a washer or friction-plate s, shewn detached at fig. 10; so that the motion of one permutation-plate may not be communicated to the other; and, to prevent the washers from turning by the independent motions of the permutation-plates, they are all formed with a tongue-feather, that fits in a groove t, of the cylinder e. All the permutation-plates, as well as the interposed washers, are pierced with a central hole to receive that part of the key formed by the plates l, and the head q, of the stem; and from the inner periphery of each permutation-plate projects a small tongue u, equal in depth to the recesses of the key-plates, but all of the same length in the direction of the periphery, and no longer than the part cut out of the periphery of the head q, of the stem; so that, when all these tongues are ranged in the same line, the key can be put in and taken out.

At the further end of the series of permutation-plates there is another plate v, (denominated the tumbler-plate), which corresponds with the head q, of the key-stem,—the tongue of this plate being made to fit the groove or recess in the periphery of the head q, of the key-stem.

A tumbler a^1, passes through a radial and longitudinal groove in the cylinder, and projects inwards beyond the inner periphery thereof. A spring d^1, (see fig. 6,) is placed at the back of the tumbler, and the tension of this spring always tends to force the tumbler inwards. The permutation-plates, as well as the washers, have all of them a recess e^1, in their outer periphery, of sufficient breadth and depth to receive the tumbler when forced in; and all the permutation-plates have a similar recess f^1, of much less depth than the recess e^1; so that when these permutation-plates are ranged with the tongues all in the same line (which is effected by the line p, of the recesses in the key-plates, when the key is in a position to be withdrawn), the tumbler will fall into the recess f^1, of all the permutation-plates, and prevent them from being shifted whilst the key is out. Other recesses, similar to e^1, and f^1, are made promiscuously in the periphery of all these plates, to act as deceptions in case of any attempt to

pick the lock. In order to prevent the tumbler from being moved back into the wrong notches e^1, these latter are provided with projecting shoulders b^1, (as shewn in fig. 9,) whereby the tumbler is stopped and prevented from entering.

The periphery of the plate *v*, is cylindrical, to fit the inner periphery of the cylinder *e*; and at the points g^1, it has a cam-formed depression, for the purpose of permitting the tumbler a^1, at the proper time, to enter the recesses of the permutation-plates,—the face of this cam-formed recess being such as, by its rotation, to force the tumbler out of the recess, so that the permutation-plates may be turned by the key. When the tumbler a^1, is forced out of the recesses e^1, of the permutation-plates, its outer face enters a groove *i*, fig. 1, made in a flanch j^1, of the lock-case, which surrounds the cylinder, and therefore locks the cylinder to prevent it from being turned. In this way the bolt is effectually locked. The operation is as follows:—The permutation-plates *r*, and the cam or tumbler-plate *v*, are in the position which they assume when the tumbler lies on the periphery of the cam-plate *v*,—the tongues of the whole of the permutation-plates having been brought, by the operation of locking, into the same line as shewn in fig. 1, and in such a position that the key may be withdrawn, and re-inserted when it may be required to open the lock. The parts being thus situated, the key may be inserted; and as the pin *j*, is free to turn in the horizontal part of the groove, nearly one entire revolution, the tumbler-plate *v*, which has the shortest recess, is turned first, and each permutation-plate will be turned in succession by its corresponding key-plate, until the recesses e^1, of the plates, are brought in a line: at the same time the cam-groove g^1, of the tumbler-plate *v*, comes into line, and thus the tumbler is permitted to enter, so that its outer face may be brought flush with the outer periphery of the cylinder. The cylinder *e*, is then free to turn, that the excentric *d*, attached thereto, may move the bolt; which is effected by the pin *j*, of the key, coming in contact with the tongue or projection *x*, of the cylinder, as shewn by dots in fig. 6. Upon continuing to turn the cylinder, by means of the key, the catch *y*, fig. 2, comes in contact with one of the pins *z*, on the ears of the barrel, which is thereby prevented from turning any further. When this has been done, the key is turned in the reverse direction. The tumbler-plate first forces out the tumbler beyond the periphery of the permutation-plates, and then the rotation of the key is continued until the pin *j*, of the key comes in contact with the opposite side of the tongue

x, of the cylinder *e*, when the tongues *u*, of all the permutation-plates will be brought into a line, as shewn in figs. 1, 2, and 6*. In this position the key can be withdrawn,—not only the bolt but the tumbler being locked.

As a matter of convenience, the permutation-plates and the key-plates are stamped with corresponding numbers or letters, so that the combination may be varied at pleasure. It will be obvious that the key, instead of being made of separate plates, may be cut out of a solid piece of metal; but this will not present the advantage of changing the combination.

The advantages derived from this arrangement of the permutation-plates and tumbler, and the formation of the key, may be obtained without employing the means herein described for throwing the bolt, as this may be done in any other desired manner, although the use of the excentric, as herein described, is preferred for this purpose. But, in some instances, as in the case of padlocks, the excentric is not used for throwing the bolt; nor is it necessary, in all instances, to have the cylinder revolve, as the arrangement of key and permutation-plates may be employed simply to place the tumbler in a position to lock the bolt.

The patentee claims the arrangement of a series of permutation-plates in a line, and on the same axis of motion, each having a central hole for the reception of the key, and a projecting tongue for the key to act upon, and a recess or recesses for the reception of, and in combination with a tumbler, as described. He also claims making the recesses in the key-plate (or the equivalent therefor) of different lengths, but all starting from the same line, to facilitate the insertion and removal of the key, as described; so that, before the key can be removed from the lock, either before or after locking, the permutation-plates may all be brought into such a position that all the tongues may be coincident one with another. He also claims the arrangement of the permutation-plates (constructed as herein described) and tumbler, in combination with a rotating cylinder, within which they are arranged, as herein described. And, finally, he claims the excentric for throwing the bolt, in combination with the rotating cylinder, the tumbler, and the permutation-plates, as described.

To George Augustus Huddart, *of Brynkir, in the county of Carnarvon, Esq., for improvements in the construction of boilers and furnaces for generating steam.*—[Sealed 1st December, 1852.]

This invention relates to certain novel arrangements or constructions of apparatus for effecting the rapid generation of steam.

In Plate VI., fig. 1, shews, in plan view, and fig. 2, in sectional elevation, an arrangement of steam-boiler and furnace, made of boiler plate-iron, and constructed according to this invention. *a, a,* is a central vertical chamber, for containing the fuel to be consumed. This fire-chamber is provided with furnace-bars *b, b,* at its lower end; and it is closed in at top by a hopper *c,* through which the fuel is fed to the furnace by the withdrawal, from time to time, of a slide, which forms the bottom of the hopper. The hopper is itself closed with a lid, to prevent the passage of air downwards with the fuel to the fire. Air, for supporting combustion, is supplied to the fire-chamber or furnace *a,* in part through the spaces between the fire-bars, but chiefly through a central air-tube *d,* which is in connection with a fan or blower, not shewn in either of the figures. This tube is pierced with holes, to allow the escape of the air therefrom in streams amongst the burning fuel. It is also furnished with radial pins *e, e,* which are intended to act as stirrers to the fire. For this purpose it is necessary to give the tube *d,* a slow rotary motion; and to this end the tube *d,* is mounted loosely on a hollow bearing *f,* and, by keying to it a bevil-wheel *g,* rotary motion may be readily communicated thereto. Projecting radially from the first chamber *a,* are the flues *h, h,* which pass through an annular water space *i, i,* and communicate with an annular flue *k, k,* which has a return at *k*, k*,* and thereby forms a second annular water space *i*, i*.* From the flue *k*,* at opposite sides thereof, rise the exit flues *l, l,* which conduct away the gaseous products of combustion from the furnace. It will now be understood that, by this arrangement of concentric flues, a very large heating surface is obtained in a comparatively contracted space; and that, by the means adopted of feeding the flame, a more regular, and, consequently, more perfect combustion of the fuel, is effected, than in ordinary steam-boiler furnaces.

Instead of forming the central fire-chamber of boiler plate-iron, and connecting it with an annular flue by means of radial flues, as already explained, with reference to fig. 2, the chamber,

in some cases, is proposed to be constructed of vertical bars, and around it vertical tubes, forming water spaces, are set (between and around which the flames will play),—the whole being enclosed by an annular water space or jacket for absorbing the heat which is not taken up by the tubes. This arrangement is shewn, in sectional plan view, at fig. 3; in which *a*, is the central fire-chamber, formed by the vertical bars *b*; and *c*, *c*, are tubular water spaces, connected at top and bottom with the annular water space or jacket *d*, *d*. The flame, it will be seen, passes from the chamber *a*, between the bars *b*, and circulates around the tubes *c*, *c*, and over the heating surface of the annular water space *d*: the gases of combustion then pass off by the vent *e*, to the chimney. The chamber *a*, is proposed to be furnished with fire-bars, as in the above-described arrangement, and in like manner to be supplied with fuel through a closed hopper, and with air for supporting combustion through a central pipe, in communication with a fan or blower.

The patentee claims the arrangements of boiler and furnace, as above described.

To Charles Edward Amos, *of the Grove, Southwark, for certain improvements in the construction of centrifugal pumps.*—[Sealed 3rd January, 1853.]

The main objects of this invention are to facilitate the manufacture of rotary or centrifugal pumps; and to render the same more serviceable for the use of contractors. In manufacturing this class of pump, it has hitherto been the practice to cast the case for containing the wheel or fan in two portions, which are counterparts (or nearly so) of each other, and to face up in a lathe the surfaces of those parts between which the wheel or fan runs, and then to bolt the two castings together; but this system has been attended with considerable expense and trouble, more especially in the manufacture of pumps of large capacity. To remedy these inconveniences, the case is cast in one piece, and by means of a man-hole, made in one side of the case, in a line with the axle of the rotating wheel or fan, a cutter is introduced into the case, to face up that part which forms the extremity of the two feed-pipes, to enable the wheel to work smoothly therein. By this means the necessity of "chucking" the case and turning it in a lathe, is avoided. To admit of the insertion and withdrawal of the wheel, a manhole is formed in the top of the case, and bearings are provided for the axle of the wheel, of such construction, that while

they will maintain the axle in its proper position, they will admit of the axle being readily drawn back out of contact with the wheel, when the wheel is, from any cause, required to be removed.

In order to render this class of pump serviceable for contractors, the patentee provides it with a suction-pipe which will accomodate itself to the varying level of the water to be raised or drawn off, and will therefore prevent the necessity of disturbing the position of the pump (for such cause) after it has been once fixed. In carrying out this object, the two water-ways—which lead to opposite sides of the wheel, and form one piece with the casing—are connected together at their lower ends by bolting thereto two cast-iron elbow-pipes, which form hollow bearings to receive a swing suction-pipe, made, by preference, of sheet iron, and of sufficient length to lead down to the tank or reservoir that is required to be exhausted.

In Plate VII., fig. 1, shews the improved centrifugal pump in side elevation; fig. 2, is a sectional elevation, taken in the line 1, 2, of fig. 1; and fig. 3, is a plan view of the same. *a, a,* is the case for containing the rotary fan or wheel *b*. This fan is affixed to an axle *c*, which works in a gland *d*, and a bearing *d**, and carries a driving-pulley *e*. The gland *d*, is fitted into a stuffing-box, cast with, and forming a portion of, the case *a*, and it is held in its place by means of bolts and tightening nuts, as shewn at fig. 2. A bracket-piece *e**, bolted to the case *a*, carries the bearing *d**, and is capable of being readily removed, together with its bearing, when the axle is required to be withdrawn. It will be seen that the axle *c*, is provided with a collar, against which the fan or wheel *b*, is tightened up, and that a removeable metal brush closes the inner end of the stuffing-box: when, therefore, the axle is drawn out, it will bring with it this brush, and also the gland *d*, and the packing contained in the stuffing-box. The case *a*, it will be seen, is formed of one casting, and it is provided at one side with a man-hole *f*, and at its upper end with a man-hole *g*. By removing the caps which respectively cover these man-holes, access is obtained to that part of the case in which the fan *b*, is to be mounted. In order to mount the fan on its axle, the fan is let down into the case through the man-hole *g*, and the axle *c*, is pushed forward through its bearing *d*, to meet the fan: the nut or other fastening is then applied through the man-hole *f*, to the end of the axle; and the bearing *d**, being fastened down, and the gland *d*, tightened up, in the usual manner, the axle is firmly secured in its proper position.

On either side of the fan are the feed-pipes or channels *h,h*; and to the lower extremities thereof the elbow-pipes *i, i*, are bolted. These elbow-pipes carry between them a suction-pipe *k*, which is made capable of rocking in its bearings, for the purpose of reaching different levels of water, without any readjustment of the pump being required. This rocking or swinging pipe is provided with lips, which take into the elbows *i, i*, like a hollow shaft into its bearing; and the position of the pipe is maintained laterally by annular shoulders on the pipe, bearing against the face of the elbows. The joints are made water-tight by means of a ring of India-rubber or other suitable elastic material placed in an annular recess, formed by grooving the abutting parts; and rings of India-rubber or other suitable material are applied to the outside of the abutting parts, and held firmly in their place by a hoop of wire or other binding material. It will now be understood, that when the pump is started in the usual manner, the water will traverse up the suction-pipe, and, dividing into two streams when it reaches the elbow-pipes, enter the fan at both sides thereof, and find an outlet from the case at the vent *l*.

The patentee claims, First,—casting the case in one piece, and furnishing the same with man-holes, arranged in the manner and for the purpose above set forth. Secondly,—mounting the axle of the fan or wheel in the manner above described; which will admit of its being readily withdrawn from the case, to allow of the removal of the fan or wheel. And, Thirdly,—the application, to centrifugal pumps, of a suction-pipe, capable of rocking in its bearings, as above explained.

To Auguste Edouard Loradoux Bellford, *of Castle-street, Holborn, for an improvement in smoothing-irons.*—[Sealed October 7th, 1852.]

This invention consists in constructing smoothing-irons in such a manner that they may retain their heat for any length of time; which heat is derived from a charcoal or other fire, placed within the iron. The body of this iron is made hollow, with a chimney at the top, and an aperture and tube at the bottom for admitting air; whereby the iron is caused to act as a furnace for the combustion of the charcoal or other fuel, by which it may be heated to a suitable degree; and by keeping up a proper supply of fuel, it may be heated for any requisite time.

In Plate VI., fig. 1, is a longitudinal vertical section of the

improved smoothing-iron, and fig. 2, is a back view of the same. *a*, is the box of the iron, which may be made varied in shape to suit the work to which it is to be applied. The bottom of the box, which forms the face of the iron, is made thicker than the sides and lid thereof, in order to prevent its becoming too highly heated. At the back of the box *a*, there is an opening *a**, from which a tube *b*, runs forward nearly to the front of the box. This tube is open in front and has openings *b**, extending nearly its entire length. To the top plate or lid *c*, of the box, a chimney *d*, is attached, and the lid is fixed to the box by angular projections in front (which fit in notches of corresponding form in the box), and by a pin *g*, passing through a lug *d**, (which stands up from the back of the box) and through the lugs *e**, and *f*. *e*, is a wooden handle, fastened to the chimney *d*, and the lug *f*, by a wire or rod *h*, passing through the handle. The fuel is placed at the sides of, in front, and above, the tube *b*, in the box; to effect which, the lid is first removed by taking out the pin *g*, and then, by means of the handle, lifting the back end to clear the lug *d**, when the projections can be drawn from their notches. At the opening *a**, (which has a register or damper *i*,) the air, to support combustion, enters, and passes through the tube or tunnel *b*, and the apertures *b**, to the fire. The supply of air is regulated—for the purpose of increasing or decreasing combustion, and thereby tempering the heat of the face of the iron—by the register or damper *i*. The draft passage *b*, being covered, and descending to the fire, prevents the escape of the fuel and consequent risk of burning or scorching the articles upon which the iron is used. A modification of the above is described by the patentee, in which the lid may be secured by hinges, springs, hooks, or any other fastenings. The chimney may be attached to the box instead of the lid, and the air to support combustion may be admitted through one or more openings above or below the level of the fire, and either through the front, sides, or top, of the back of the box. The fuel may be supported upon a grate, with a proper draft below it.

The patentee claims a smoothing-iron whose body is hollow, and furnished with a chimney, and also with proper means of admitting air, substantially as described; so as to constitute a furnace for the combustion of fuel, for the purpose of heating the face of the iron, and keeping it heated to a proper degree during use.

To Alfred Vincent Newton, *of the Office for Patents, 66, Chancery-lane, mechanical draughtsman, for an improved mode of separating substances of different specific gravities,—being a communication.*—[Sealed 10th January, 1853.]

The leading object of this invention is to separate copper ore from the gangue and other mineral or earthy substances of less specific gravity, with which it is found; but the invention, as will be seen from the following description, is equally applicable to the separation of other substances of different specific gravities.

The separation of substances having different specific gravities, is effected by the action of currents of water, induced by the vibratory motion, in water, of a pan (containing the substances to be acted upon) constructed with a bottom of wire-cloth, or its equivalent, and jointed, at or near one end, to a sustaining-rod or axle, and at the other end supported by rods or links from a crank-shaft, or an equivalent therefor. The downward motion, through the water, of the pan, with the substances to be separated resting on it, causes the water to pass, in small jets, through the meshes or perforations in the bottom of the pan, and to lift up and, as it were, float the substances to be separated;—the currents, induced in the water by the vibratory motion of the pan, will therefore act on the various substances according to the difference of their specific gravities, and thus effectually separate them,—the heavier substances, such as the ore, being delivered at one end of the pan, and the lighter substances at the other.

In Plate VI., fig. 1, is a plan view of the machinery employed for effecting the desired object; fig. 2, is a longitudinal vertical section, taken at the line A, B, of fig. 1; and fig. 3, is a cross vertical section. *a*, represents a box or reservoir, which is to be supplied with water. Within this box is suspended a pan, composed of side pieces *b*, *b*, and one end piece: these all extend (as represented at fig. 2,) above and below the bottom,—the end piece being a segment of a circle, of which the axis of vibration of the pan is the centre: these are all properly connected together, and the bottom *c*, is composed of fine wire-gauze; which bottom is slightly curved in its longitudinal direction. One end of this pan is suspended from a rod *d*, which runs entirely across the box or receiver, and is formed with journals at the ends, fitted to turn in bearings *e*, *e*, which can be adjusted longitudinally and vertically: the other end of the pan is suspended by or connected

with two cranks *f, f,* on the shaft *g,* by means of connecting-rods *h, h;* so that, by the rotation of the shaft *g,* that end of the pan has a vibratory motion up and down, and the whole a slight longitudinal motion.

The bearings *e, e,* are attached by screws *i, i,* passing through elongated holes, to the upper ends of two plates *j, j,* (shewn at fig. 3,) which are, in turn, secured to the sides of the box by screws *k, k,* passing through elongated holes; so that the position of that end of the pan can be adjusted longitudinally and vertically, relatively to the crank, to increase or decrease the general inclination of the wire-gauze bottom; for the greater the inclination, the more perfect and slower will be the separation of the substances, and *vice versâ.*

The ore, gangue, &c., previously reduced by grinding, is put upon the pan about midway between the two ends; and, as the pan vibrates in the water, the separation of the ore from the lighter substances is effected by the passage through the meshes of the water which lifts the matters contained in the pan, leaving the holes free for the passage of water; and, in rising, the holes or meshes are partially closed by the falling of the metallic matters. The water, thus retained in the pan, is impelled towards the lower end thereof; and, in escaping from the pan, it carries down with it the lighter substances. At the same time, the impulse given by the crank-motion, impels the heavier or metallic particles towards the crank end, where they are discharged through holes *l, l,* near that end of the pan. The water should be kept above the perforated bottom of the pan during the operation, but as little above it as practicable, as the operation is then most perfect. The ore and refuse matter can be collected in appropriate receptacles, placed under the ends of the pan.

The patentee claims separating substances of different specific gravities by means of a pan, with a perforated bottom, working in water with a vibratory motion, on an axle at or near one end, and communicated by a crank, or its equivalent, at or near the other end, substantially as specified.

To John Lee Stevens, *of Kennington, in the county of Surrey, for improvements in furnaces.*—[Sealed 27th October, 1852.]

This invention consists in employing revolving screw fire-bars in furnaces, combined with fixed bars. The revolving bars are placed in pairs between the fixed bars, and each of a pair of

such revolving bars is caused to move in an opposite direction to its fellow. At the further end or back of this combined set of fire-bars another set of fixed bars is placed; so that the fuel, being moved by the revolving bars towards the back of the furnace, will travel on the fixed bars, between each pair of revolving bars, and be pushed on the back set of fixed bars by the fresh fuel that is fed on to, and gradually carried forward by, the motion of the revolving bars.

In Plate VII., fig 1, is a longitudinal section, and fig. 2, is a plan view of the improved furnace. *a, a,* are the revolving fire-bars, and *b, b,* the fixed bars placed between the revolving bars. *c, c,* is the set of fixed bars, placed at the back or further end of the bars *a,* and *b.* In order to prevent the fuel from lodging against the sides of the furnace, angle pieces *d, d,* are fixed thereto, extending the entire length of the revolving bars *a.* Fig 3, is an end view, in which is shewn a mode of giving motion to the revolving bars.

The patentee remarks, that as a full description of the double furnace arrangements, shewn at A, B, and C, was given in the specification of a patent for improvements in furnaces, granted to him on the 1st October, 1852, it will be unnecessary to describe the same.*

In all cases it is preferred that the combination of bars *a,* and *b,* should be placed horizontally; and the set of bars *c,* should incline downward from the level of the former in the ratio of about one in twelve; so that the fuel from the bars *a,* and *b,* may more readily descend towards the back of the bars *c.*

The patentee states that he is aware that the idea of using revolving bars, of the form set forth in the drawings, is not new, as bars of that form were proposed in the specification of Mr. Samuel Hall's patent, 20th February, 1845, but found to be impracticable for use in the manner therein described; he does not, therefore, claim the exclusive use of such bars; but he claims "the use of revolving bars used in pairs between fixed bars; each of a pair of such revolving bars being caused to move in an opposite direction from its fellow, in the manner previously described: and in combination with such arrangement, the use of a set of fixed bars at the further end or back of the first-described combined set of bars, as herein explained."

* See p. 104, *ante.*

To Francis Warren, *of Millbank-street, in the county of Middlesex, for improvements in gas-burners.*—[Sealed 6th October, 1852.]

This invention relates to a mode of obtaining a more complete combustion of gas than heretofore, and consists in applying to argand, fish-tail, bat's-wing, or other forms of gas-burners, a wire or wires, so as to pass through, and divide, the flame.

In Plate VI., figs. 1, and 2, shew, in side elevation and plan view, an argand burner; and fig. 3, a side view of a fish-tail burner, furnished with a wire according to this invention. The ends of the wire enter sockets on opposite sides of the burner; by which means the wire can be readily applied or removed; the holes in the sockets being drilled to receive the ends of the wire freely, and permit of its being moved higher or lower, by pressing down the ends of the wire more or less into, or raising them in the sockets. Or the sockets may be made separate from the burners, and have female screws formed therein, suitable to receive male screws fitted to the outside of the burners; by which means the position of the wire in the flame may be adjusted, by screwing the sockets higher or lower on to the screws fitted on the outside of the burners.

The patentee remarks, that the above described modes of applying wires to the flames of argand, fish-tail, bat's-wing, and such like gas-burners, are most advantageous when burning poor gas.

He claims the application, as herein described, of a wire or wires to argand, fish-tail, bat's-wing, and such like gas-burners.

To Edward Joseph Hughes, *of Manchester, for an improved method of purifying and concentrating the coloring matter of madder, munjeet, and spent madder.*—[Sealed 8th October, 1852.]

The patentee, in describing this invention, states, that instead of treating munjeet, madder, or spent madder with a moderate quantity of concentrated acid and water, turning to account the heat generated by the acid and water, and then, applying steam to produce articles usually known in the trade as "guaroncine" or "guaronceur," he takes concentrated acid and adds 20 to 25 per cent. of water; which mixture must be left to become quite cold. To this he adds, in a slow and

careful manner (so as not to raise the temperature beyond about 125° Fahr.) for every 100 parts, by weight, of the said mixture, 35 to 40 parts, by weight, of spent madder, or of madder, or munjeet; which madder or munjeet must have been previously well washed and fermented, and then washed. The fermentation is to be effected by any of the usual processes, but not to be continued so as to reach the usual point of acid fermentation. When the aforesaid mixture forms a paste or thickish substance, it is diluted with water; after which, a large quantity of cold water is immediately thrown upon it, with continuous stirring, to wash out the acid. To the last washing it is desirable that some neutralizing matter, such as chalk, soda, or other ingredient, be added, to effect the complete neutralization of the acid. The material may then be pressed, dried, and ground.

The patentee claims the method of purifying and concentrating the coloring matter of munjeet, madder, and spent madder as herein described.

To JOHN SYMONDS, *of Glass-House-yard, East Smithfield, galvanized iron merchant, and* GEORGE MOUCHET, *of Battersea, Gent., for an improved mode of cleaning or scaling metallic surfaces.*—[Sealed 8th December, 1852.]

THE object of this invention is to avoid the waste and deterioration of metal inseparable from the use of the methods of cleaning and scaling metallic surfaces heretofore known and employed; and, at the same time, and as a consequence of such improved method of cleaning and scaling, to leave the metals with a smoother, closer, and more even surface; whereby they will be the better fitted for any subsequent process or processes of manufacture.

The improved process consists in bringing the various metal articles intended to be cleaned into contact (whilst immersed in the cleaning mixture or pickle) with a metallic conducting medium, which is also in close metallic contact with a mass of metal likewise immersed in the same cleaning mixture, and in an electro-positive state, as regards the said metal articles. The electro-positive mass is preferred to consist of zinc, and, when using this metal, is enclosed in a porous cell or cells, or enveloping diaphragm; by the intervention whereof the injurious effects arising from the metallic and other deposits (which, but for such protecting enclosure, would interfere with, and, to a great extent, prevent the said

cleaning operation) are effectually avoided; and which injurious result is inseparable from the immersion of zinc, so in metallic connection with the articles to be cleaned, into the same pickling mixture, unprovided with such protecting diaphragm. By this arrangement the metallic articles to be cleaned, are not injuriously acted upon or corroded by the pickle or cleaning mixture used; which, during the operation of cleaning, acts upon the scale and dirt only, without attacking the already cleaned, or partially cleaned surface.

In carrying out the invention the patentees employ a tank fitted up as shewn in Plate VII., wherein fig. 1, is a plan view; fig. 2, is a longitudinal section, taken in the line 1, 2, of fig. 1, and shewing the arrangement of the zinc plates enclosed in porous cells; and fig. 3, is a longitudinal section, taken in the line 3, 4, of fig. 1. *a, a,* is the tank which is to contain the pickle, and also the articles to be cleaned. On the floor of the tank a steam-pipe *b, b,* is arranged for heating the pickle, when it is required to expedite the cleaning action. The tank is divided into two parts by the porous cells *c, c,* which are situated in the middle of the tank. These cells are carried by a frame, which will admit of their being readily lifted out when required. *d, d,* are zinc plates, attached, by clamps or solder, to an iron rod *e,* which is secured to a cross-bar that rests upon the ends of the tank, and is held in position by pins, as shewn in the drawing, fig. 3. By this means the zinc plates are suspended in their cells, and are brought into electric connection with each other; while, at the same time, great facility is given for removing the plates, when required, from their cells. The two divisions of the tank are provided with adjustable platforms for supporting the articles to be operated upon. These platforms may be of wood, and should be perforated, to allow of the scale and dirt which result from the cleaning operation, being deposited beneath them, and clear of the articles in the pickle. Attached to the upper surface of the platforms is an iron rod *g,* bent to a serpentine form, as shewn at fig. 1, and intended to furnish a means of metallic contact with the articles subjected to the cleaning operation, and, by that means, to bring them within the circuit of the currents of electricity pervading the tank. One end of the rod *g,* is connected by a copper wire *h,* with the rod *e,* which carries the zinc plates; and the electricity generated by the action on the zinc of the exciting liquor in the porous cells, is conducted to that end of the serpentine rod *g,* in connection with the copper wire; whence it passes, or is presumed to pass over the whole surface of the rod *g,*

and the metallic substances (if any) in contact therewith, and, finally, completes its circuit by means of the conducting power of the exciting liquor or cleaning solution. In order to insure as perfect metallic connection as possible between the metallic articles to be cleaned and the electric conducting surfaces, the mode of arranging the articles in the tank is varied according to their nature. Thus, when small articles, of various sizes and irregular forms, are required to be operated upon, they are thrown into the tank in a heap, and rely upon their own gravity for establishing a proper metallic contact between themselves and with the iron electric conductor *g*. When, however, articles of a regular figure and uniform size, such as plates, are to be subjected to the electric action, guide-frames are provided, as shewn at *i, i*, between which the plates may be held in a vertical position, and apart from each other, so as to allow of the pickle acting upon the entire surface of the plates during the whole time they are immersed, and thereby preventing the necessity of manual labor, as hitherto required, to separate them while the cleaning operation is proceeding, for the purpose of exposing the surfaces previously covered by overlying plates to the action of the pickle. The inner edges of these frames *i, i*, are furnished with vertical notches or grooves, formed of, or covered with iron; and between these notches the plates, to be cleaned, are dropped, and firmly secured by wedges,—their weight being taken by the platforms, on the serpentine rod *g*, of which their lower edges rest. Metallic contact is thus secured between all the plates in each division of the tank; and when the electric action is set up in the tank, the cleaning and scaling operation will, by the combined action of the pickle and the electric current, be expeditiously performed. To allow of plates of varied dimensions being arranged vertically in the tank, the frames *i, i*, are made capable of adjustment to meet different lengths of plates; and, by blocking up the platforms at a different level, narrower or wider plates may be readily introduced. In order to admit of this change of level in the conducting-rod *g*, the copper wire *h*, which is attached to the end thereof, is twisted into a helix; and thereby it will allow of elongation and contraction, as circumstances may require.

If the articles, to be cleaned, consist of wrought-iron, they are allowed to rest upon a cast-iron grating, instead of upon the platform, as explained;—the zinc and porous cells, with their suspending frame, may be dispensed with, as the electric action on the cast-iron grating (whilst the grating is immersed in the cleaning mixture and in contact with the articles to be

operated upon) will protect the said articles from being injuriously acted upon or corroded, beyond the removal therefrom of the scale, oxide, or dirt. Or this protecting action may be further aided by the use, in addition, of cast-iron, inserted in the porous cells in place of zinc, and in metallic connection with the metallic grating above mentioned. The intention of employing the porous cells is, in this case, as when zinc is used, to prevent the resulting oxide from mixing with the cleaning mixture.

In cleaning wire, the hanks are suspended in the pickle, and one or both of the free ends of each hank are connected with the notched frames before described for sheets, by wedging such free end in the notches of the frames, so as to ensure close metallic contact therewith; and the frames are connected with the metal in the porous cells, or with the cast-iron grating or metal supports, as the case may be.

The treatment for cleaning articles of copper, brass, or gun-metal is, in all respects, analogous to that of iron, as before described, excepting that for copper and its alloys separate and distinct tanks or vessels should be used, to prevent the accidental presence of any of the salts of copper in the pickle wherein iron is being cleaned, or in the tanks or vessels used for iron articles; as the metallic copper would be precipitated by the action of the electric current, and, consequently, discolor the iron.

The pickle or cleaning mixture employed in the tanks and porous cells consists of, say, fifty pounds weight of salt to every hundred gallons of water; to which, according to the rapidity with which the cleaning operation is required to proceed, either sulphuric or muriatic acid is added, in about the proportion of half a pint of acid to each gallon of mixture.

When the cleaning operation is being conducted on a large scale, and where several tanks, charged with the articles, are simultaneously in use, the patentees sometimes prefer a modification of the above process, as follows:—Instead of connecting the articles in each separate tank with the positive metal in such tank, the whole of the tanks are brought into the condition of having one continuous current of electricity established through the whole number or series thereof, by making metallic connection between the positive metal in the one with the metal articles in the next; and so on throughout the entire series of tanks or vessels intended to be brought into action; and then establishing metallic connection between the positive metal of the last with the metal articles in the first of such series, substantially in the manner of ordinary galvanic batteries.

The patentees claim, First,—the cleaning and scaling of metallic surfaces by the combined action of a saline solution (whether acidulated or not) and electric currents, when such currents are produced through the agency of zinc contained in a porous cell or cells, or of cast-iron, employed as above set forth. Secondly,—arranging metallic sheets, for the purpose of scaling and cleaning them, in tanks, as above described, whereby the pickle is allowed free access to the surface of the sheets during the whole time they are exposed to the cleaning action. And, Lastly,—clamping articles to be cleaned or scaled, to the electric conducting medium, for the purpose above set forth.

To Alfred Vincent Newton, *of the Office for Patents, 66, Chancery-lane, mechanical draughtsman, for an invention of an improved mode of manufacturing railway chairs, —being a communication.*—[Sealed 19th October, 1852.]

This invention relates to the rolling of railroad chairs in continuous lengths, which lengths are to be divided off into any suitable lengths to form chairs, and are then to be finished in the usual manner.

In carrying out this invention the iron may be piled, heated, and rolled, in any well-known manner, to a proper shape to enter the bending rolls. The various forms which the bar may assume, previous to the bending, will be understood by reference to the sectional diagrams in Plate VII., marked 1, 2, 3, 4. When reduced to the latter form, the bar may be passed between the bending rolls to take the shape represented in the sectional diagram, marked 5. It is then to be carried to a mandril, situate between a pair of grooved rollers, in the manner to be presently explained; and, by the action of these rollers, it is caused to take the required sectional shape.

In Plate VII., fig. 1, represents, in back elevation, and fig. 2, in vertical cross section (taken through the line A, B, of fig. 1,), the machinery employed for this purpose; and figs. 3, and 4, represent detached portions, specially referred to in the description. A, represents the upper, and B, the lower roller, suitably arranged in a substantial frame C. These rollers are geared together and bear the usual relative proportional diameters necessary for "throwing down" the bar to prevent it from being coiled or bent around the rollers. The bottom roller B, is represented with three wide grooves, marked 1, 2, 3, of which the two extremes, 2, and 3, are dupli-

cates. The bar of iron under operation, after having been successively rolled into the forms represented by the sections numbered 1, 2, 3, 4, (and which forms may be arrived at by more or less progressive operations of the rolls) is then placed in the groove 1, and, by the peculiar form or shape of the top roll over the said groove, it is bent into the shape represented by the sectional diagram numbered 5. It is then placed in the groove 2, where it is drawn over a mandril N, which is supported between the rolls, in the manner to be presently described, and rolled into any desired form, corresponding, of course, to the form of the mandril N, and the contact surface of the roller B. After this operation, and whilst it is still hot, the bar may, if thought desirable, be cut into lengths, corresponding to the length of chairs required, and punched, and finished.

The lever M, to which the mandril N, is attached, is supported, at its hinder end, by the shaft O, which passes through, or may otherwise be securely connected to the frame, in such manner, however, as to yield to the adjustment of the lever. The mandril N, may be dovetailed on top, and fastened to the lever M, by the key *e*; and on the top of the lever M, is placed a friction-brass *b*, intended to take into the deep groove on the top roll, to preserve its exact position. The brass *b*, is set loosely in an open mortice in the top of the lever, and may be made to bear against the top roll with a greater or less pressure, as may be required, by means of a wedge-shaped bolt *d*, which passes through the head of the lever M, and upon which the said brass rests. An accurate adjustment of the lever and mandril may also be made by this wedge-shaped bolt *d*, and the nuts *c*, on its end. The general adjustment of the lever is made by the suspension-rod *f*, passing through it and through a cross-bar P, above it, which also prevents the lever and mandril from being forced down by the upper roll.

Fig. 3, is a vertical section, taken through the mandril and lever at the line C, D, of fig. 2; and fig. 4, is a top view of the mandril, detached from the lever. In fig. 4, *i*, represents the dovetail, which slides over a corresponding tongue on the lever; the two being held together by the key *e*, before described. *v*, represents the flanges of the mandril, over which the lips of the chair are formed. The thickness of the bottom or base of the chair can be regulated and adjusted by the wedge-shaped bolt *d*, and its nuts, and by the suspension-rod *f*.

It has been stated above, that the first part of the bending (as shewn at the section numbered 5,) is done without the

mandril;—to what extent this part of the bending may be done, may be inferred from the fact, that the function of the mandril is only to insure that the inner form of the chairs shall be suitable for the rails which they are designed to support (allowance being made for the shrinking of the metal), and that the lips shall not be bent too much; and the action of the mandril may be considered rather as passive than active in the forming of the chair by the rolls.

The patentee claims the rolling of railroad chairs over a mandril or its equivalent, in continuous lengths, substantially as described.

To JOHN SAYERS, *of Poplar, carpenter and ship's joiner, for improved arrangements for maintaining a level surface or level surfaces upon or in connection with bodies subject to a rocking motion.*—[Sealed 1st October, 1852.]

THIS invention consists in a mode of maintaining the level of any surface liable to be displaced by a tilting motion, such as that to which tables are liable on shipboard; the object being to enable dishes or open vessels containing liquids to rest securely on such surfaces, notwithstanding the rocking motion of the ship. This is effected by placing above the ordinary tables or sideboards a series of small tables or shelves, connected by means of uprights sliding freely through holes made in the ordinary table, sideboard, &c., to a weighted apparatus underneath.

In Plate VI., fig. 1, is an end view of a ship's dining table, placed fore and aft, with the apparatus attached; fig. 2, is a cross section of a table fixed athwart ship; and fig. 3, is a sectional elevation of a ship's sideboard. *a, a,* are the shelves or small tables, supported at each end by metal hinges *e, e,* which are fixed to the ordinary table, and are connected to the shelves by a bolt or pin. Fixed to the under side of the shelves *a, a,* are metal uprights *b, b,* which slide freely through holes made in the top of the ordinary tables, and rest on the ends of the sway beams or suspension cross-pieces *c, c,* underneath; which sway-beams are supported by hinge-pieces *d, d,* fixed to the under side of the ordinary table or sideboard. Arms, projecting downwards from the centre of the suspension cross-pieces, connected together by rods *f, f,* support the weight *g.*

The patentee claims, the combining and arranging shelves, and apparatus connected therewith, in such a manner as to preserve their level, as above described.

To Joseph Cliff, *of Leeds, fire-brick manufacturer, for improvements in the mode of making and compressing bricks, lumps, tiles, quarries, terra-cotta, and other similar articles.*—[Sealed 4th December, 1852.]

This invention relates to a novel or improved mode of applying steam pressure direct to the material to be operated upon, instead of compressing the clay or other material by means of mechanical or hydraulic pressure. The improvements may be applied to the making of bricks or other similar solid articles, from disintegrated or pulverized clay, or clay otherwise prepared. This direct steam pressure is also applicable to compressing or finishing bricks, pipes, or other similar articles which may have been previously made or fashioned into the required shape by the above or any other suitable process. In order to compress or finish bricks and other similar solid articles, suitable dies or moulds must be provided; and for compressing and finishing pipes or other similar articles, not only dies or moulds are required, but suitable cores must be inserted therein, so as to support the hollow articles while under pressure.

In Plate VII., fig. 1, is a side elevation of the machine complete, and fig. 2, is another elevation, shewing the manner of working the pressing and discharging apparatus. A, is the foundation, on which the machine rests; B, is the iron foundation-plate, to which the columns or pillars C, C, are firmly secured. The steam-cylinder D, is mounted on the top of these columns, and the whole is firmly secured to the foundation-plate by bolts and nuts. F, is the piston, (see fig. 2,) and G, the piston-rod of the steam-cylinder D. The piston-rod is connected at its lower end with the boss H, to which are secured the two pressure-plates I, I. The moulding-boxes L, L, are placed on a circular table J, which is capable of revolving horizontally upon an upright shaft. These moulds L, L, merely consist of rectangular or other suitably-shaped openings made in the circular table J. M, M, are two of eight plates, fitted to the moulds L, L, and capable of sliding up and down within them. N, is a block or vertical standard, fixed to the foundation-plate B, immediately under the pressure-plates I, I, and mould-plates M, M; which mould-plates, together with the circular table J, revolve above it: this constitutes the moulding apparatus. The discharging apparatus is worked by means of a projecting arm O, which extends horizontally from the boss H, and, by means of the rod P, actuates the lever Q, which vibrates upon a centre R, and is connected at

its other end with the discharger S. The circular table J, which carries the moulds, is actuated by the piston U, of the small steam-cylinder T; the piston-rod V, being jointed to the connecting-rod W, the further end of which has a hook X, projecting downwards, and is capable of sliding forwards in the sunk ratchetted groove or race Y, on the upper surface of J. The race Y, is divided into four equal distances, each space or distance inclining upwards in its length from the bottom of one ratchet to the top of the next. The connecting-rod W, has a joint at *a*, to allow of its ascent up the race Y, and its descent when past the next ratchet. Thus the working and reciprocating action of the piston U, causes an intermittent motion of the circular table J, in the manner and at the time required. The operation of feeding the machine is accomplished by filling the hopper with clay; and as the moulds in the circular table J, are brought under the hopper, the clay falls in by its own gravity.

The operation of the machine is as follows:—Suppose the several parts of the machine to be in the position represented in fig. 1, steam will be admitted from the boiler into the steam-chests of the cylinders D, and T. As the steam enters the cylinder D, on the under side of the piston F, it will keep the latter in the position shewn in the figures; and the steam, on entering the front end of the cylinder T, will force back the piston U, and, when drawn forward again, it will, by means of the piston-rod V, and connecting-rod W, move the circular table J, round its centre, and thereby bring two of the moulds L, L, which, at the commencement, were under the hopper, receiving their charge of clay, immediately under the pressing-plates I, I. When the piston U, is forced back within a short distance of the end of the cylinder T, the pin *c*, on the head of the piston-rod V, will come against the arm or projecting piece *d*, of the lever rod *e*, which, being connected with the elbow-lever *f*, will actuate the slide-valves of the cylinder D, and cause the steam to enter and act on the upper side of the piston F, which, by its descent, will force down the pressing-plates I, I, upon the clay in the moulds L, L, and thereby form a brick therein. Before the piston F, has got to the bottom of the cylinder D, the upper end of the opening *g*, in the arm *h*, of the boss H, presses upon the elbow lever *i*, and draws back the valve-rod *j*; thereby causing the steam to act on the opposite side of the piston U, and force the connecting-rod W, to slide forward in the race Y, to the next ratchet on the cylinder table J. Immediately previous to the falling down of the hooked end X, of the connecting-rod W, the pin

c, on the head of the piston-rod V, presses against the arm or projecting piece *k*, of the lever-rod *e*; and, by pushing forward the elbow-lever *f*, the valves of the valve-chest of the cylinder D, are again changed, and the piston-rod *g*, and the piston F, are caused to ascend to their first position. The lower end of the opening *g*, of the arm *h*, in its ascent, presses against the lever *i*, and forces forward the rod *j*, and changes the position of the steam-ports, as at the commencement; thereby causing the movement of the piston of the cylinder T, and, through it, that of the circular table J. It will therefore be seen that the piston of the one cylinder works the valves of the other cylinder,—thus keeping up a succession of alternate motions. The next movement of the circular table J, places the moulds containing the bricks just pressed or formed, immediately over the discharging apparatus S, which forces the bricks out at the next descent of the piston F. The next movement of the circular table places the mould from which the bricks just discharged have been removed, immediately under the downward projection *l*, of the arm *h*, which, in its descent, forces down the plates M, M, to the bottom of the moulds. Thus, at every motion of the circular table J, two moulds are placed under the feed hopper, and filled with clay; and at every descent of the piston F, two bricks are made; and two bricks previously made are discharged from the moulds; the plates M, M, are also placed in their proper positions to receive the clay upon the next motion of the circular table. A plate *m*, is fixed to the block or standard N, immediately under those openings in the circular table J, which are receiving their charge of clay. To prevent the possibility of the circular table J, being moved too far, a bar *n*, is fixed to the head of the piston-rod V, and a pin or roller *o*, projecting from it, slides with every motion of the piston U, in a groove or race of the lever *p*, which vibrates upon a centre *q*. This lever is placed obliquely to the direction of the piston-rod V, and is connected at its other end with the upright bar *r*, which is moved up and down in the standard *s*; and, previous to the circular table J, being carried to its extent, the upper end of the bar *r*, is elevated higher than the lower edge of the under projection *t*, of the circular table J, and thereby intercepts or prevents its further progress. A slotted bar-guide *v*, is fixed to the under side of the cylinder D, with a groove or race in it, to allow the lever *h*, to slide up and down, in order to prevent the piston F, from moving round horizontally in the cylinder.

The arrangement of machinery employed for compressing or finishing pipes is shewn at figs. 3, and 4. Fig. 3, is a side

elevation, and fig. 4, an end elevation of the machine. The foundation-plate is firmly secured to masonry as in the former instance. The pipe to be compressed is shewn at I, and is fixed on a mandril or core J, and placed in the lower die or mould B, which is secured to the foundation-plate. The upper die or mould C, is attached to the piston-boss D, at the lower end of the piston-rod E. The piston F, works in the ordinary manner in the steam-cylinder G, which is supported by the beams H, H. The mandril or core J, on which the pipe to be compressed is placed, is mounted on a central shaft K, supported by the standards L, L, in which it is allowed to revolve.

In order to ensure accuracy in the motions of the moulds or dies C, guides M, M, are fixed to the supports of the lower die, and lugs or ears N, N, are attached to the moveable die C, for the purpose of receiving the rods or guides M, M. O, O, are semicircular cutters, fixed to each end of the dies B, and C, for the purpose of cutting off the pipe to its proper length. P, is a handle or winch, to turn round the core J, and the pipe that is placed thereon. Q, is a lever, to work the steam-valve, and R, R, are hanging brackets, for supporting the lever shaft.

The operation of the machine is as follows:—Suppose the machine to be in the position shewn at figs. 3, and 4, and the core J, inserted into the pipe I, and placed in the lower mould B;—the lever Q, is then drawn forward, and, by admitting steam to the cylinder, the piston F, is caused to descend, and force down the upper mould or die C, upon the pipe which is placed on the core. The cutters O, O, will then cut the pipe to its proper length; and the pipe, being rather larger than the internal diameter of the dies B, and C, will be compressed to the proper shape and density. The handle or winch P, is then placed on the end of the centre shaft K, and turned round, to give a polish to the internal surface of the pipe, and to loosen the core; the lever Q, is next reversed, and the piston F, made to ascend, taking along with it the upper mould C: the pipe I, is then to be removed from the lower die, and replaced by another. The compressing or finishing of bricks, lumps, tiles, quarries, terra-cotta, and other similar solid articles, will be performed with a machine, similar in construction to the brick-making machine already described. The bricks are to be made rather thicker than will be ultimately required, and placed in the moulds of the circular table J; when they will be compressed by the plates I, I.

The patentee claims, First,—the general arrangement, construction, and combination of parts above shewn and described, or any mere modification thereof, when employed for similar

purposes. Secondly,—he claims the employment of direct steam pressure, for the purpose of making, consolidating, or compressing disintegrated or pulverized clay, or clay otherwise prepared, into the form of bricks, lumps, tiles, quarries, terra-cotta, and other similar solid articles, whatever mechanism may be employed for the purpose. Thirdly,—the employment of direct steam pressure, for the purpose of compressing or finishing bricks, lumps, tiles, quarries, terra-cotta, pipes, or other similar articles, previously made by the above or any other method.

To John Wheeley Lea, *of the City of Worcester, chemist, and* William Hunt, *of Stoke Prior, in the county of Worcester, manufacturing chemist, for improvements in the manufacture of iron.*—[Sealed 22nd November, 1852.]

These improvements in the manufacture of iron consist in the application of carburetted hydrogen or coal gas, obtained from the carbonization of coal, or the making of coke, to heating the furnaces used in the various processes of making iron. In order to carry out these improvements, an ordinary gasometer is adapted (by means of pipes) to an ordinary coke-oven, or series of coke-ovens, for the purpose of receiving the combustible gases, which are conducted thereto from the coke-ovens. The combustible gases having being collected, they are to be conveyed, by pipes, from the gasometer to the furnaces, where they are to be consumed. It will, of course, be understood that these supply-pipes must have branch-pipes to each furnace, and must be provided with stop-cocks to regulate the supply. It is desirable that the combustible gases should be introduced into the furnace at the end furthest from the exit-flue; and they are admitted to the interior of the furnace through a pipe perforated with small holes, and which is therefore called the burner: the quantity of holes and size of the pipe or burner will depend upon the quantity of gas required to be supplied. Under or above this gas-burner an air-channel is made, and provided with a slide or damper for regulating the supply of atmospheric air, which is admitted to assist the combustion of the coal-gases, and which is drawn in by the chimney draft, or it may be forced in by a pump or fan. Hot air is proposed to be used when convenient; in which case it is preferred to force the air in, by means of an air-pump or fan, through pipes, which may be placed under the furnace bottom, or in the walls of the furnace, in order that the air may become heated. Whether

hot or cold air be used, it should, in either case, be brought into close contact with the coal-gas at the point where the latter enters the furnace, so as to effect a quick combustion of the gases, and thereby produce intense heat. Coke or coal, or even anthracite coal, may be used in connection with carburetted hydrogen or coal-gas obtained from making coke; and when either coke or coal is used, in connection with the above gases, the ordinary fire-grate, or any modification thereof, is employed, in which the coke or coal is placed for combustion; and the gases are introduced about one-fourth of the way up the coal or coke in the grate, so as to cause it to percolate through the body of coal in combination with the unconsumed oxygen of the air, which will assist the combustion.

In Plate VII., fig. 1, is a longitudinal section of a puddling furnace, with the improvements adapted thereto; and fig. 2, is a front view of the same. *a, a,* is a puddling furnace of the ordinary construction; *b, b,* is the furnace or fire-place, where the gases are consumed or burnt, and heat is generated for acting on and heating the iron; *c,* is a metal gas-pipe for conveying the carburetted hydrogen or other combustible gases from the gasometer to the furnace. This pipe *c,* is perforated with holes, so as to admit the gas in jets; and immediately above is a channel or passage *d,* having a number of holes made therein, and communicating with the interior of the furnace: this passage is provided with a sliding door or shutter *e,* whereby the supply of air is regulated. The gases, when admitted to the interior of the furnace from the pipe *c,* are ignited, and their combustion is assisted and promoted by the admission of atmospheric air, which is supplied through the openings of the passage *d.*

The patentees claim the application to the manufacture of iron, as aforesaid, of carburetted hydrogen or other combustible gases, obtained from the carbonization of coal, or during the manufacture of coke.

To Thomas Greenshields, *of Stoke Works, Worcestershire, for improvements in the manufacture of alkali.*—[Sealed 22nd December, 1852.]

In carrying out his invention, the patentee takes sixty-eight pounds of sulphate of lime, burned and pulverized, and adds thereto eight pounds of fine slack (finely pulverized coal),—mixing them well together. This compound is put into a

reverberatory or other suitable furnace, and kept stirred until the whole has become of one uniform dull red heat throughout; care being taken that the temperature be rather lower than a cherry or dull red heat. Sixty pounds of fine grained salt are now to be added, and the whole well and thoroughly mixed; and the temperature of the furnace is to be raised to a good red but below a white heat. The mixture will gradually flux and become quite fluid, when it is to be well mixed by raking or stirring, until the mass has become thoroughly heated of one uniform temperature. Pulverized coke is next to be added and well raked in, and in sufficient quantity to separate the fluid mass, and cause it to work freely, without adhering to the rake or instrument used in working. The temperature is to be maintained until the whole of the chlorine is driven off; and this may be readily ascertained by drawing portions of the charge to the furnace door, as a very small portion of gas escaping may then be seen. When the whole of the chlorine is driven off, the charge is to be drawn from the furnace, and suffered to cool. The sulphate of lime, slack, and coke, may be all mixed before putting them into the furnace, but the method before described is preferred.

When the mass has become cold it is placed in lixiviating vats; the soda salts are dissolved by water, and the solution is allowed to run off, through a filter, from the unconsumed carbonaceous and other insoluble matter, into a receiver; it is then to be reduced by evaporation to a salt. The soda salts, so obtained, are to be mixed with fine slack and carbonate of lime, and placed in a reverberatory furnace, known as a black ash furnace, for decomposing the soda salts, and obtaining carbonate of soda, as is well understood.

When the decomposition has been completed in the black ash furnace, the charge is drawn from the furnace, and allowed to cool: it is then placed in lixiviating vats, and the carbonate of soda is dissolved by water. The solution is allowed to run off the unconsumed carbonaceous matter, and the insoluble sulphate, and other combinations of sulphur with lime, and the liquid is converted into carbonate of soda, as is well understood. The insoluble residue left in the vats is again used in decomposing salt, as before described.

The patentee states that he does not confine himself to the proportions stated, as other proportions may be used, but he prefers to use those described. Nor does he confine himself to the apparatus hereinbefore mentioned, as other apparatus may be employed for the purpose. The following are his claims:—

"What I claim, as my invention, is the mode above described for effecting the decomposition of salt by means of the sulphate of lime, fine slack, or coke, for obtaining soda salts, as before described. I also claim, as my invention, the residue left in the black ash vats, for effecting the decomposition of salt, for obtaining soda salts."

To PETER WARREN, *of Stratmore-terrace, Shadwell, papermaker, for an improved material applicable to many purposes for which papier-maché and gutta-percha have been or may be used.*—[Sealed 12th October, 1852.]

THIS invention consists in manufacturing a new material or composition, of a character analogous to papier-maché, which is capable of being employed either as a substitute for papier-maché or gutta-percha, and its compounds, in forming or manufacturing various articles for which these substances are now used, such as panels and mouldings for railway carriages, trays, picture and other frames, door knobs, buttons, &c., by treating the straw of any fibrous vegetable material in the manner hereinafter described. In order to carry out this invention, straw of any fibrous vegetable substances, such as wheat, barley, oats, rye, and other similar straws, are cut into short lengths, by means of any suitable cutting machine. When these straws have any knots, it is necessary to open out and divide the same, which is effected by passing the straw through a pair of millstones, or between crushing rollers; or they may be submitted to the action of any other equivalent apparatus, so that the knots and fibres may be thoroughly and effectually separated and divided. In some cases, either hot or cold water, or other liquid is applied to the materials under operation, in order to facilitate this process. The cut and divided straw is then boiled in a strong alkaline lye, or solution of caustic alkali, such as soda, potash, &c., until a pulpy mass is produced,—which effect will, however, greatly depend on the nature of the straw operated on, and the strength of the alkaline lye, or solution which is employed. The mass is then transferred to the machine known in the paper-making trade as the rag-engine, where it is reduced to pulp, in the manner usually practised when operating on rags, &c., in the manufacture of paper. The pulp is then partially dried; in which state it may be pressed or rolled into sheets, or moulded into other forms. These sheets or moulded articles are then dipped into oleaginous or glutinous matter, or oil, and are afterwards baked in an oven similar to that employed when

manufacturing sheets or moulded articles of papier-maché. The sheets or moulded articles, thus formed or manufactured, may be ornamented in any desired manner, either by japanning, or painting and varnishing, or by inlaying the surface with shell, or other analogous material, as is commonly practised in the ornamenting of articles composed of papier-maché and gutta-percha. When the sheets or moulded articles are required to be colored, pigments or coloring matter might be introduced into the pulp while in the rag-engine; the subsequent processes of drying, rolling, pressing, or moulding, being performed as previously described.

The patentee claims the manufacture of a material which may be used as a substitute for papier-maché, and for many purposes to which papier-maché and gutta-percha have been or may be employed, from straw pulp submitted to pressure, and then oiled and baked as hereinbefore described.

To Edward Lawson, *of Leeds, machine maker, for certain improvements in machinery for preparing to be spun, hemp, flax, tow, wool, silk, cotton, and other fibrous materials.*— [Sealed 1st November, 1852.]

This invention consists in combining with the machine well known as Heilmann's combing machine, or machines acting in the same manner, a "screw gill," or "circular gill" drawing head. In place of taking the combed sliver as it comes from the machine, and putting it into a can or other receptacle, or winding it on a bobbin, the patentee takes the sliver from each head (where there is more than one head), and bringing them together, passes them through a screw gill, or circular gill drawing apparatus. By so doing, he states that the sliver is rendered not only more even, but will hold together much better than the sliver which comes from the machine without passing through a drawing process. He has not considered it necessary to give any drawings to shew the mode of combining the screw gill, or circular gill drawing apparatus with the said combing machines, as it is entirely a matter of driving and speeding from some part of the combing machine, which would vary in applying it to different machines, and which any mechanic, having the idea and explanation herein given, will be able to carry into effect; but he states that he prefers to place the screw or circular gill drawing head at about the position that the last delivery rollers occupy, and to drive it by the same shaft, or by suitable gearing from the

main shaft, of course, so speeded that the drawing apparatus will take up the sliver as fast as it is delivered by the drawing or detaching rollers of the machine.

In conclusion, the patentee says:—"It will be understood that I do not claim, as of my invention, either the combing machine or circular gill or screw gill drawing apparatus, which are well known; but only their combination, in the manner hereinbefore described."

To PETER WARD, *of Oldbury, in the county of Worcester, for improvements in the manufacture of sal-ammoniac, and obtaining salts of ammonia.*—[Sealed October 7th, 1852.]

THIS invention consists, first, in lining the domes of subliming pots with plaster of Paris (sulphate of lime), or with such substances as will set or adhere to the domes, and not discolor the sal-ammoniac, such as Roman cement, or a composition of such substances with sand, carbonate of lime, alumina, or the silicate of alumina. When the lining has set on the domes, charcoal and water, or black lead and water, is brushed all over the lining, so as to facilitate the removal of the cakes of sal-ammoniac from the domes.

The second head of the invention refers to the treatment of gas-water, which has been subjected to distillation, to remove the ammonia. When it is found that no more ammonia comes over, what remains in the still is run off into a suitable receiver; and as much muriatic or sulphuric acid is added, as will saturate any ammoniacal salts present,—which salts are found to be principally in the state of sulphurets. The liquor is again put into a still, and as much finely-slacked lime is added as will decompose the muriate or sulphate of ammonia: heat is then applied, and free ammonia comes over.

Thirdly:—For the purpose of separating ammonia from coal-gas, muriatic or sulphuric acid, combined with sawdust, tanners' bark, the sulphates of lime, barytes, strontium, or such other suitable substances as will retain either of these acids without effecting a chemical combination with them, are used: such mixture is placed in purifiers, and the gas is allowed to pass through, previous to being purified in the lime purifiers, or after it has been purified; but to use them after the coal-gas has been passed through the purifiers is preferable.

Fourthly:—The next mode of obtaining ammonia from coal-gas consists in introducing sulphurous acid into the coal-gas, when generated in the gas retorts, or after it has been passed from the hydraulic main to the condensers, and previous to

being purified in the lime purifiers. Or the sulphurous acid may be introduced after the gas has been purified; but in that case, the gas should be passed through fresh lime purifiers, or such other materials as would combine with and take up the excess of sulphurous acid which might be present. Sulphurous acid is generated for the above purpose by putting into the gas retorts (at the time of charging with coal) a quantity of copperas (sulphate of iron) sufficient to produce sulphurous acid, so as to saturate or combine with the ammonia present: or a separate retort is used, in which sulphate of iron is decomposed, so as to produce sulphurous acid, and allow the sulphurous gas to pass into the gas main with the coal-gas, previous to entering the condensers and lime purifiers.

In carrying out the first part of this invention, the patentee takes plaster of Paris (sulphate of lime), Roman cement, silicates of alumina, the earths combined with acids, or in a free state, vegetable or mineral substances (as charcoal, coke-dust, or other carbonaceous matter), sand, quartz, basalt, or such other substances of a like nature, either separately or mixed together; he mixes them up with water, in the usual manner, and covers the inside of the domes of the subliming pots with this composition, to the thickness of one inch for large domes, and less in proportion for smaller ones; and, after it has set or dried, the domes are brushed over with a mixture of finely-powdered charcoal or black lead, mixed with water, so as to facilitate the removal of the cakes of sal-ammoniac therefrom.

The second improvement, which relates, as before said, to the treatment of gas-water, consists in adding to gas-water (after it has been distilled to that point which some manufacturers consider a fit state to run off as waste water, or at such a stage of the distillation as when no more ammoniacal gas comes over,) muriatic or sulphuric acid, in sufficient quantity to saturate the sulphuret of ammonium present. The waste gas-water is found to contain sulphuret of ammonium, which is not volatilized at the temperature of boiling water; but, by the addition of either of the above acids, the sulphuret becomes decomposed, and a muriate or sulphate of ammonia is formed, as the case may be; then, by adding finely-slacked lime, and applying heat, the salts of ammonia will be decomposed, and caustic or free ammonia comes over. This part of the invention may be performed either in the still, after the distillation has proceeded to the point which has been previously described; or the waste liquor may be run off from the still into a tank, and the acid added, until it be found that the sulphuret of

ammonium has been saturated; after which it may be put into a still and the lime added. The distillation may then be proceeded with until all the ammonium has come over.

The third improvement consists in the application, for the extraction of ammonia from coal-gas, of muriatic or sulphuric acid, combined with sawdust, bark, dried peat, charcoal, coke, the sulphates of lime, barytes, strontium, the silicates of alumina, or any of the earths combined with acids, or any vegetable or mineral substances which are capable of holding these acids in combination, without materially changing their acid properties. For this purpose muriatic acid, of a specific gravity of 1·1431, or sulphuric acid, of a specific gravity of 1·2490 or thereabouts, is used. These materials are placed in purifiers, and the gas is allowed to pass through previous to being purified, or after it has been purified; but it is preferred to use them after the coal-gas has been passed through the lime purifiers.

The fourth improvement consists in another mode of obtaining ammonia from coal-gas, and consists in introducing sulphurous acid into the coal-gas, when generated in the retorts, or after it has passed from the hydraulic main to the condensers, and previous to entering the lime purifiers, so as to combine with the ammonia, and form a sulphite or sulphate of ammonia, which will be found dissolved or mixed with the gas-water. The sulphurous acid may be introduced after the gas has been purified; but, in that case, the gas should be passed again through lime purifiers, or through such other materials as will combine with and take up any excess of sulphurous acid that might be present. Sulphurous acid is generated for the above purpose by putting into the gas retorts, at the time of charging them with coal, a quantity of copperas (sulphate of iron) sufficient to produce sulphurous acid, to saturate or combine with the ammonia that may be formed; or a separate retort is used, in which sulphate of iron is decomposed, so as to produce sulphurous acid, and allow the sulphurous gas to pass into the gas-main with the coal-gas, as before described.

The patentee claims, First,—the lining of domes, used in the process of subliming sal-ammoniac, with such materials as herein described. Secondly,—the use of muriatic or sulphuric acids, to saturate the sulphuret of ammonium, as herein described. Thirdly,—the use of muriatic or sulphuric acid, for the separation of ammonia from coal-gas, as herein described. And, Lastly,—the use of sulphurous gas, for the separation of ammonia from coal-gas.

To Charles Frederick Bielefeld, *of the Strand, for improvements in billiard and bagatelle tables.*—[Sealed 28th October, 1852.]

This invention consists in employing papier-maché, or a plastic composition of a similar nature, to form the beds or surfaces of billiard or bagatelle tables; the advantage of which application is, that the material is lighter and less liable to warp by change of temperature than the materials hitherto employed for the like purpose. In order to carry out this invention, a strong rectangular wooden frame is constructed, and, at certain distances apart, transverse and diagonal bars are placed; by which means a strong bed-frame is obtained, which is supported by legs; and the substance or thickness of the wood forming such frame will depend on the size of the billiard or bagatelle table intended to be made. On the upper surface of this bed-frame, transverse battens are fixed, leaving a small space between each of a neighbouring pair of battens, which, together with the frame, should be of the best seasoned wood. A large sheet of papier-maché, or plastic composition of a similar nature, is then prepared, so as to be laid on the upper surface of the frame (such sheet of material is preferred to be manufactured according to the manner described in the specification of a patent granted to the present patentee on the 24th day of February, 1851*); the under surface of which is to be planed; after which, it is to be covered with white lead, before it is fixed on to the battens, which are likewise coated over with white lead; and the papier-maché is fixed to the battens by screws passed through the same at intervals. The upper surface of the papier-maché is then planed, and the table is furnished with cushions and pockets, in the ordinary manner. Instead of using wood for the bed and frame, iron may be used; and the papier-maché may be fixed to an iron bed-plate by screws.

The patentee remarks, that although he prefers the surface of papier-maché should be of one piece, and that the frame on to which it is fixed should be in one, he does not confine himself thereto; as in cases where it is required to transport a table to any distance, it may be desirable to make the surface or bed of the table of several pieces, correctly formed, in order that they may fit truly together.

The patentee claims the application of papier-maché, or a plastic substance of the nature thereof, in the manufacture of billiard and bagatelle tables, as herein described.

* See Vol. xl., C. S., p. 21.

To Robert William Sievier, *of Upper Holloway, Gent., for improvements applicable to the manufacture of hats, caps, and bonnets, or other coverings for the head.*— [Sealed 2nd November, 1852.]

This invention of improvements, applicable to the manufacture of hats, caps, and bonnets, or other coverings for the head, consists in the employment of a novel material, tissue, or fabric, for the manufacture of such articles; and also in the application thereto of ribbons, flowers, or other ornaments made of similar materials.

The novel material which is employed for the above purposes is made of wire, which is woven or otherwise made into cloth, tissue, or fabric, and may be used either alone or in combination with other materials. In making the bodies of hats, caps, or bonnets, the intended shape is first cut out of this cloth, fabric, or tissue, made either by weaving, platting, or braiding wire by any of the known processes; or tissues or fabrics, made by two or more of these processes, can be combined in the same article if required. The bodies or foundations of men's hats, or soldiers' caps, are made simply of plain woven wire cloth, which, when cut out in the required form, must be, as far as possible, pressed into shape,—the jointed parts being secured by solder or other suitable means. These metallic bodies may be combined, if necessary, with other materials, and fashioned into the form required; and the bodies, so made, are then to be covered or lined with any suitable material, according to the kind of article intended to be produced; and, by this means, hats and coverings for the head can be made perfectly ventilating and light, and, at the same time, very strong and durable: caps being more round, and having less abrupt corners than hats or bonnets, can be easily pressed into the required form by dies, and the several parts united together by solder or otherwise. For soldiers' and policemen's hats or caps, certain parts thereof may, if required, be made of a stronger wire or fabric; or some other material introduced, so that they may resist a heavy blow or a sabre cut. Ladies' caps or bonnets are to be made of a more ornamental fabric, such as is produced either by braiding, platting, or plain or cross weaving; or manufactured into a fabric in the same manner as pillow lace or bobbin net.

The ornaments to be applied to ladies' caps or bonnets, such as flowers, braid, ribbons, or figured fabrics, are made either by cross weaving, so as to render them elegant and

fanciful, or the flowers may be made of a plain wire fabric, cut out in the form of leaves or other pieces of suitable size and form, and assembled together, as in the ordinary manufacture of artificial flowers. The articles or ornaments, so made, are to be electrotyped in gold, silver, or any other metal; or they may be colored or varnished in any way desired, so as to give them a varied and elegant appearance.

The shapes for ladies' bonnets may be lined with ordinary materials, and decorated with flowers, ribbons, or other ornaments, as the wearer may desire.

For coiffures or ladies' head-dresses, various kinds of fabrics or tissues, made of wire, as aforesaid, may be combined; and flowers, braid, ribbons, or other ornaments, made of the same or similar materials, may be applied thereto; or ordinary flowers or ornaments may, if preferred, be employed. An infinite variety of designs for fabrics suitable for ladies' bonnets, caps, or head-dresses, may be made in ordinary lace machinery. For making ribbons or braid, the ordinary machines usually employed for these purposes, are also applicable; and very varied and pleasing effects may be produced by employing wires of various colors, in the same way that silk or other threads of varied colors are now used.

The patentee claims making hats, caps, bonnets, or other coverings for the head, of wire fabrics or tissues, made by any of the usual or other suitable processes of manufacturing such fabrics or tissues; he also claims the application to hats, caps, bonnets, or other coverings for the head, of flowers, ribbons, or other ornaments made of electrotyped or colored wire, as aforesaid.

To Arnold James Cooley, *of Parliament-street, Westminster, consulting chemist, for improvements in the manufacture of artificial leather.*—[Sealed 23rd October, 1852.]

In carrying out this invention the patentee takes gutta-percha, gutta-tuban, gutta-gireck, or any other of the hydrocarbons or substances met with in commerce, and commonly known by the name of gutta-percha; or he takes the newly imported substance, called "catimundo," or any like substance or substances possessing similar properties to those of the hydrocarbons or substances above mentioned; or he takes any mixtures of the said substances, and having reduced them to fragments, by cutting, planing, rasping, or grinding them, or by any other convenient or suitable method, garbles or sepa-

rates the purer portion from the refuse or foreign matter previously mixed with it, and introduces the said garbled portions into any convenient vessel admitting of being closely covered up and heated, and of agitation or stirring, pounding or kneading, being applied to its contents. Heat is then applied to the said vessel and its contents, and kept up until the latter are reduced, by the aid of frequent stirring or agitation, to a perfectly soft dough or paste. Sometimes, to assist the process, and for certain purposes, the patentee adds to the substance or substances, so heated, small quantities of the oil of turpentine, pyrogenous oil of turpentine, rectified mineral or coal-tar, naphtha or bitumen, benzole, bisulphuret of carbon, pine oil, resin oil, caoutchoucine, or any similar solvents or liquids, either singly, or in mixtures of two or more of them; which liquid additions are incorporated with the other ingredient or ingredients, by agitation and stirring, until the mixture is reduced to a homogeneous dough or paste, possessing less consistency than it would do without such addition. The dough, so prepared, is then allowed to repose for some time; the heat being continued, and for some purposes slightly increased. After some time further, during which the softened or melted mass generally separates into two or more portions, the partly purified mass is taken out, and at once employed in the manner hereinafter mentioned; or it is further purified by passing it through strainers or media of metal wire, or perforated metallic plates, by means of either hand, steam, or hydraulic pressure. Any quantity of the substance or substances, so prepared, or of the ordinary gutta-percha of commerce, is next reduced to the state of dough or paste, by heating it in some suitable vessel admitting of its contents being pounded, ground, or forcibly agitated together; and of being closed or partially closed, to prevent, when desired, evaporation and the access of air; and the said dough or paste is kept at a heat varying, according to the results desired, of from 175° to 250° Fahr. (more or less), for a period varying in like manner from 30 minutes to 48 hours (more or less) according to the purpose to which the composition is intended to be applied, and during the time the pounding or forcible stirring of the same is continued. To the paste or dough, so produced or manufactured, the patentee adds—according to the degree of cellularity or porosity required in the artificial leather under preparation—from 25 to 400 per cent. (more or less) of powdered crude or commercial carbonate or sesquicarbonate of soda, Scotch soda, soda-ash, common culinary salt, or chloride of sodium, or of

any other salt or salts, or saline matter, freely soluble in water; or of powdered carbonate or sesquicarbonate of ammonia, or of any other like substance freely soluble in water, and volatilizable by a moderate heat; or of powdered sugar, gum, British gum, or roasted starch, or of any other like saccharine or gummy substance or substances freely soluble in water; and he mixes the said saline matters, salts, gums, or sugars, either one, or mixtures of two or more of them, with the before-described and softened gutta-percha, or other hydrocarbons or materials, by means of pounding, stirring, or grinding together in any suitable or convenient vessel or apparatus, either alone or with the addition thereto, as may be required, of 15 to 50 per cent. of oil of turpentine, pyrogenous oil of turpentine, rectified mineral or coal-tar, naphtha, or bitumen, pine oil, resin oil, benzole, bisulphuret of carbon, caoutchoucine, or any of the solvents or liquids hereinbefore mentioned, or of any other like solvents or liquids, either singly or in mixtures of two or more of them; and the aforesaid agitation or grinding is continued until a perfectly homogeneous dough or paste is produced,—observing always to keep the heat employed some degrees below the liquefying or melting temperature of the saline matters, salts, gums, or sugars, respectively employed in the manner before described. The temperature of the dough is next regulated, to allow of its being conveniently employed in the formation of sheets, skins, pieces, and other useful articles, in the way hereinafter mentioned. Thus, for example, if it is desired to prepare an artificial leather as a substitute for the leather which is manufactured from cow-hides, the paste or dough is submitted to a heat of 175°, or thereabouts, for a period of from 30 to 40 minutes; and then, say, 50 per cent. of any one of the soluble substances above named is added to the dough, and the compound is otherwise treated in the manner above explained.—Or if a thick, spongy, or porous artificial leather is required to be produced, the patentee adds, say, from 300 to 400 per cent. of the soluble matters above mentioned; the paste or dough having previously been subjected to a temperature of from 200 to 220° for from half an hour to one hour,—it being understood that the quality of toughness and smoothness is in a great part obtained by the application of a high and long sustained temperature.

When it is desired to increase the capacity of the said composition to resist heat, and to harden the same, the patentee adds to the prepared dough or paste—before the addition of the powdered saline, saccharine, or gummy substances, and

other articles referred to in the last before-described process—asphaltum, or solid bitumen, or shellac; and when it is desired to render it more elastic or flexible, caoutchouc is also added thereto, previously dissolved or reduced to a dough or paste by means of heat, and the addition of the essential oil of turpentine, pyrogenous oil of turpentine, rectified mineral or coal tar, naphtha, bisulphuret of carbon, pine oil, caoutchouc, vegetable or wood naphtha, or any similar solvent of the above-named added substances; which are incorporated by means of heat and agitation or pounding. Or, instead thereof, powdered sulphate of baryta or heavy spar, hydrate of lime or slaked lime, finely-powdered caustic or quick lime, calcined magnesia or carbonate of magnesia, sulphate of lead, sulphuret of lead, or hyposulphite of lead,—any one, or a mixture of any two or more of these substances are added to the before-described dough or paste, and the admixture and union of the said combined materials are promoted by exposing the same to a heat of from 180° to 300° Fahr. (more or less)—the higher temperatures being employed when a more rapid or perfect union of the materials is desired—and by stirring, rubbing, and grinding, in the way already described. The mass is then either at once made into sheets and other forms, or previouly mixed, in any required proportions, with the dough or paste, in either of the stages of preparation already mentioned, and in any desired proportion; and after again submitting the mass to heat, it is treated as before.

For certain purposes—more especially in adapting the sheets for the purposes of being joined by sewing—to the dough or paste is also added, in any of its before-described stages of manufacture or condition, or to any mixture of them, from two to twenty per cent. (more or less) of wool (preferably carded without oil), or of carded cotton, silk, flax, hemp, holz-wolle, or wood, or pine wool, or of such other like fibrous substances; the admixture of which, with the dough or paste, is effected by means of heating and stirring the mass, until the fibrous substances become equally distributed throughout its bulk: after which, it may be made into shells or other useful forms, in the same way as the other before-named compositions.

When required to possess great hardness, without flexibility, the patentee adds to any one of the compositions before referred to, or to any mixture of two or more of them, whilst in the state of dough or paste, wool-dust, cotton-dust or refuse, saw-dust, wood-dust, cork-dust, raspings and cuttings of cork, filings or drillings of iron, steel, copper, and other metals,

pounded glass, flints, or quartz, or siliceous sand, either singly, or in the form of mixtures of two or more of them; which is then manufactured into sheets, blocks, and other useful forms.

When it is desired to impart any particular color to the compositions now described, any of the ordinary pigments or stains are mixed therewith,—the preference being given to those containing a sulphuret of a metal or a metallic base, and to those stains that readily impart a color to resin, wax, and oil.

Any one of the before-described compositions or combinations of materials are then taken, either singly, or in mixtures of two or more of them (while in the state of dough or paste, and still warm) and the mass is formed into sheets or skins by passing it between rollers or cylinders of metal, stone, wood, or paper, or any combination of the same,—the surfaces of the said rollers or cylinders being polished, grained, or figured in any manner it is desired that the surface of the artificial leather shall also be. And it is preferred to pass the sheets or skins, so produced, through another like pair of cylinders, or a second time through those first used, but in a cross direction, or at a right angle with that before employed, for the purpose of equalizing the grain, or partially destroying the same, and strengthening the sheets. Sheets or skins are also produced out of the said dough or composition, by forming it first into blocks or lumps, by pressure between surfaces of stone, wood or metal; which blocks or lumps are subsequently cut into sheets or skins by means of knives or saws. Sheets are also formed out of the said mixture of materials or dough by spreading it on the surface of an endless band of metal, parchment, leather, felt, gutta-percha, India-rubber, canvas, calico, or any other textile fabric or suitable material, in a common spreading machine; adhesion between the band and the then preparing artificial leather being prevented by keeping the surface of the former moistened with water or oil, or with a weak solution of soft soap or sugar. The patentee also frequently forms the body of the sheet or skin of one combination of the above-named materials, and the face of one or both of its surfaces by another, either by the processes of rolling, or by spreading, as already described; by which means, he is enabled to combine compositions of different degrees of compactness, porosity, and strength, and of different colors. When it is required to strengthen the sheets composed of any of the mixtures of materials before described, the composition is applied, by means of a spreading machine, to a back or foundation of some felted, woven, or other suitable fabric, and a compound sheet is thereby formed, which may be applied to

various useful purposes. The said compositions are also moulded or pressed into various forms, and articles adapted to either useful or ornamental purposes, and which are now commonly made of leather.

The sheets, skins, or other articles, prepared as already described, are next subjected to some or all of the processes or manipulations hereinafter mentioned, as the case may require.

When any saline, saccharine, or gummy matter has been used in the preparation of the sheets, or skins, or other articles, they are first exposed, for a short time, to the air, and then immersed in cisterns, pits, vats, or other convenient receptacles, containing water, and are submitted to long soaking, varying from 12 to 48 hours, according to the density of the material while in the water, or when removed temporarily from the water. The sheets, skins, or other articles, containing soluble matter, are then submitted to frequent agitation, rubbing, rolling, and like manipulations, until their pores open, and they become sufficiently soft and flexible; they are then drained, and subjected to a second immersion and like treatment in fresh water, frequently renewed; after which they are hung up or otherwise exposed to the air to dry. When the sheets are very thick, or when great porosity is required in the thinner sheets, the processes of soaking, rinsing, and drying, are repeated a second and sometimes a third time,—it being preferred to allow some days to elapse between the same; during which period the sheets or skins are exposed to a current of warm air at a temperature of 85° to 100° Fahr., or thereabouts. The second water is also commonly acidulated with sulphuric acid, or oil of vitriol, or fresh burnt and slaked lime is added thereto. When ammonia, or any of its preparations, or any like volatile substance is employed, instead of the other before-named saline, gummy, or saccharine matters, it is preferred to keep the sheets or skins for some days in a current of air, heated to the temperature above named, to facilitate the evaporation of the ammonia or other like volatile substance, before subjecting them to the subsequent processes of soaking, washing, and drying.

The patentee next takes the articles so prepared, and having cleaned their surfaces from foreign matter, and smoothed and rubbed off any inequalities or defects with a piece of pumice stone, and fish or shark skin, and a polished wooden rubber, they are sorted into classes, depending on their texture, stiffness, flexibility, and other qualities. Those that are too stiff and rigid are then softened by rubbing, rolling, and the

like manipulations. Those that are too soft and loose in their texture are submitted a second time to pressure between rollers, by which their compactness and strength become increased; and at the same time any desired surface may be given to them in the manner already described. A peculiar grain or pattern is also produced on the skins, by causing the one cylinder to revolve, by means of cog-wheels, a little faster than the other.

The sheets, skins, or other like articles, are now ready to be subjected to one or more of the processes hereinafter described, as desired, in a manner somewhat resembling the like operations with animal leather.

The sheets or skins are stained by brushing them over with, or immersing them in, a strong liquor of any of the common dyes, to which a little gum-arabic, British gum, white of egg, bullocks' blood, or solution of starch, has been added, at a temperature of from 70° to 90° Fahr., more or less. This operation succeeds best with those skins abounding in fibrous matter.

The sheets and skins of artificial leather are next prepared with a mixture of oil and fat, or any like greasy substance, which is applied by means of friction, and any suitable rubber, and is allowed to remain applied until a sufficient degree of softness or power of repelling water is produced. Sometimes the same object is effected by simple immersion in a cistern containing the said oily or greasy matter, heated to a temperature of about 85° to 95° Fahr., or the lowest point that will produce partial liquefaction. After a time the sheets or skins are removed and drained, and the superfluous grease and oil is wiped off.

For some purposes the sheets or skins are prepared by smearing or rubbing them with pigeons' dung, white of egg, bullocks' blood, milk, and other like substances, either alone or mixed together, until the required degree of softness, toughness, compactness, smoothness of texture, and the like, is produced; after which they are cleared off as before mentioned, and exposed to dry.

For like purposes the last two processes are united together, and a mixture of the several articles therein mentioned is employed, which is thickened with starch or barley-meal, and applied to the back of the said sheets or skins by smearing and friction.

The front surface of the skins is then commonly colored by rubbing in Prussian blue, or any other desired pigment, combined with calcined lamp-black, ground up with any of

the before-named liquids or solvents,—the preference being given to pyrogenous oil of turpentine. When the surface thus given is dry, a little of the same coloring matter, ground up, is applied, in common size, bullocks' blood, or white of egg, by means of a common rubber; and sometimes the latter method is employed without previously preparing the surface, as last before described.

When it is desired to imitate enamelled or patent leathers, or glazed or varnished leather, a varnish is applied for that purpose before oiling, greasing, or otherwise finishing off the same, in the manner above described,—either omitting those processes altogether, or not employing them until the varnishes become perfectly dry and hard. The patentee states, that he does not confine himself to the use of any particular varnish or japan, but merely selects one which is hard, tough, and flexible; and he prefers to effect the drying and hardening of the same in an atmosphere heated to from 85° to 100° Fahr.

Sometimes the back of the sheets or skins is finished off with fancy linings of silk, cotton, thread, or woollen fabrics, which are caused to adhere to the said sheets or skins by passing them between cylinders or rollers whilst the material is in a soft and adhesive state, or by spreading the material or composition thereon. Otherwise the same purpose is effected by passing the two substances between rollers—the one next the woven fabric being sufficiently heated to produce adhesion.

In some cases, the said sheets, skins, or articles, are finished off by only one of the above-described methods of finishing the same; at other times two or more of them are employed, according to the description of leather it is desired to imitate.

The patentee claims the treatment of the vegetable gums or hydrocarbons above enumerated, in the manner and for the purpose above set forth.

To ARNOLD JAMES COOLEY, *of Parliament-street, Westminster, consulting chemist, for improvements in treating woven and felted fabrics, to render the same repellent to water and damp.*—[Sealed 29th October, 1852.]

IN carrying out these improvements, in the preparation and finishing off of felted and woven fabrics, the patentee takes the fabric or material to be operated upon, and having rendered it perfectly smooth and flat, in any ordinary way, the compo-

sition, described below in Appendix A, is spread over one of its surfaces by means of suitable brushes, spatulas, or spreading-irons, or by an ordinary spreading machine; after which the fabric is hung up to dry and harden, either in the air, at ordinary temperatures, or in a stove-room, in the manner hereinafter described.

For those articles requiring greater durability, or waterproof qualities to be imparted to them, and which require both surfaces to be prepared or finished off in the same manner and color, as soon as the first coat or surface is dry, a coat of the composition (already referred to) is also put on the other side; after which the patentee proceeds as before.

When it is desired still further to carry out the same intention, the fabric or material under preparation is passed through the before-named composition or mixture, gently heated in any suitable cistern or vessel; and it is then passed under a scraper or scrapers, or between rollers loosely set, and so constructed that they may be adjusted, by means of screws, at any desired distance apart, so that they may remove the superfluous portion of the composition, and reduce the adhering coating of the same to any required thickness, or so press the body of the textile fabric as to leave it more or less saturated with the composition.

When one of the surfaces, commonly the inner or wrong side of the fabric under preparation, is required to be of a different color to the other, the same process is adopted as before described; but the composition described below in Appendix B, is employed.

For the preparation of fabrics requiring to be more durable and more thoroughly repellent to water and damp than either of the preceding, and particularly for fabrics of considerable thickness, or of a loose or spongy texture, before submitting them to either of the before-described processes for coating their surfaces, they are passed through a cistern or vessel (in the manner just mentioned) containing the composition described below in Appendix C, and then between rollers, or under a scraper or scrapers, to remove or press out the superfluous composition absorbed by, or adhering to the fabric or material. The partly prepared fabric is then exposed to dry and harden, before being further submitted to any of the before-described methods for preparing one or both of the surfaces thereof.

For drying and hardening the surfaces given as aforesaid, or the composition absorbed by, or pressed into, the pores of

the said felted or woven fabrics, they are exposed to the action of warm dry air until the requisite degree of dryness and hardness is obtained; and, for this purpose, the heat of a stove room, hot room, or drying closet, or current of hot air, obtained in any convenient way, is preferred,—care being taken that the temperature is kept low at first, commencing at, say, 70° to 90° Fahr., and afterwards gradually raised, as the process of hardening progresses, to, say, 180° or 200°, or thereabouts, more or less.

For the purpose of imparting a smooth, polished, figured, or grained appearance to the surface or surfaces of the felted or woven fabrics, coated or prepared as before described, they are passed, when just sufficiently dry and hard to bear strong pressure without becoming sticky or adhesive, between polished, engraved, grained, or chased cylinders of wood, metal, or paper, or a combination of them; or between a pair of rollers or cylinders of any desired surface, driven at unequal speed, so that the motion of the one being always a little faster than the other, a crimping effect will be produced on the surface of the fabrics; after which they are further submitted to the action of air and warmth, as before described.

Another description of surface to felted and woven fabrics is obtained by sprinkling on their surfaces, coated as aforesaid, and whilst still adhesive, or only partly dry, powdered or ground silk, wool, woollen cloth, cotton, or floss, either of their natural colors or dyed and stained artificially: in the same manner the various metallic bronzes, in powder, powdered talc, finely-powdered oxide of copper, gold, silver, copper, and other metal dust or powder, and gold and silver leaf and other metals, in the form of leaves or foil, are used. Gentle pressure is then applied, and, after exposure again to air and heat, and to further and increased pressure, the fabrics are submitted to air and heat, until the desired degree of hardness is obtained.

One of the surfaces of the woven or felted fabrics, coated as before described, is sometimes prepared by attaching thereto, either for use or ornament, a surface of some thin linen, cotton, woollen, or silk fabric. This is effected by applying either of the last-named materials to the coated surface of the woven or felted fabric, under preparation, before it has become quite dry, and applying pressure by passing the combined materials between a pair of rollers or cylinders. The same object is also obtained, when the composition is hard and fully dry, by heating the cylinder next the said silk, woollen, cotton, or linen fabrics, so to be applied. When it

is desired to attach any one of the last-named fabrics to the wrong or unprepared side of any woven or felted fabric, having the other coated in the manner hereinbefore described, any cheap and simple cement is used, very sparingly applied; and adhesion is promoted between the two surfaces by pressure between rollers or cylinders, as previously mentioned.

The surface or surfaces of the woven or felted fabrics, prepared as before described, are further finished with wool, silk, cotton, or flax dust, or floss, by lightly brushing them with an ordinary cloth brush; those whose surfaces have been prepared with bronze, metallic, and other like powders, and with metallic leaf or foil, by simple brushing, and sometimes by further passing them between polished or chased rollers, as aforesaid; and those prepared with smooth or grained surfaces, without any of the last hereinbefore-named articles or substances, by lightly moistening them by means of a dabber or brush, with a thin solution of pure bees' wax, dissolved in oil of turpentine, and scented with essential oil of lemons, or some other odorous substance, and, when dry, polishing the surface by means of a brush or rubber of woollen cloth or leather. The prepared surface of the coated fabrics is sometimes finished off by applying thereto a coat of varnish, and drying the same in the usual way; a varnish that combines moderate hardness with flexibility being selected for the purpose.

Sometimes one only of the before-described processes is employed for preparing felted and woven fabrics; at other times two or more of them, according to the purposes required, as already explained.

Appendix A.

The compositions referred to under this head are made by melting bees' wax (perfectly free from admixture with tallow or grease) with from two to ten per cent. of good litharge or oxide of lead; and while the mixture is still fluid, good drying or boiled linseed oil, or the compositions forming the basis of printing ink, known as printers' varnish, or mixtures of the two, in the proportion of from twice to six times the weight of the wax employed, together with sufficient lamp-black, wool or cotton dust, or any of the common pigments or coloring substances, not being of a greasy nature, are added thereto, to impart the desired color; and after thoroughly evaporating the mixture by heat, and cooling, it is thinned down, if too thick, with rectified oil of turpentine or any other like fluid, according to whether it be intended to use it warm or cold. When it is desired to give a superior degree of hardness to

the composition, when dry, and to render it better able to resist the action of heat, a portion of amber, copal, or asphaltum—previously dissolved or softened by means of rectified oil of turpentine, or some other similar solvent—is added thereto, and mixed in the way previously described. Or varnishes, prepared from those substances, are added for the same purpose,—taking care to add such resinous substances so sparingly that they shall not impart a brittleness to the composition. Small quantities of benzoin, balsam of Peru, camphor, essential oil of lemons, ambergris, civet musk, or other like substances, or mixtures of two or more of them, are commonly added to the composition, for the purpose of imparting a slight odour to the prepared fabric, or of displacing that which arises from the substances employed in its preparation.

Appendix B.

The basis of the composition here referred to, is similar to that described in Appendix A; but being less liable to be exposed to friction and heat, a larger proportion of wax is generally employed,—amber, copal, or asphaltum being rarely added to harden the same. The use of this composition being commonly to imitate the wrong side of leather, yellow ochre, or Oxford ochre, or a mixture of the two, is usually employed; to which is sometimes added a little burnt umber, to produce the desired shade of yellowish brown, or brown, in imitation of the color of the undressed side of animal leather.

Appendix C.

The composition here referred to, is made by boiling together equal parts of pure bees' wax and boiled oil, with about five or six per cent. of litharge, and sometimes a little printers' varnish or oil of turpentine, without any coloring matter; and sometimes, and for rough purposes, a mixture of about ninety parts of boiled oil and five parts, each, of soap and bees' wax, united by agitation and heat, are employed. For very thin fabrics, bees' wax, boiled with five per cent. of litharge, and thinned down to the consistence of a thick varnish (when cold), is sometimes employed, with rectified oil of turpentine.

The patentee claims the preparation of woven and felted fabrics in the manner herein described, so as to render them repellent to water and damp.

To William Chisholm, *of Holloway, chemist, for improvements in obtaining caustic soda and other substances from the residues of articles used in the purification of gas.*—[Sealed 19th October, 1852.]

In carrying out this invention the patentee takes peat charcoal, and adds thereto an equal quantity of chloride of sodium. This mixture is placed in a dry lime purifier, and the gas is made to pass through it as through the lime now used; whereby the chloride of sodium is decomposed by the hydrosulphate of ammonia contained in the gas, and hydrochlorate of ammonia and hydrosulphate of soda are formed. The soluble salts, thus obtained, are separated from the mixture, either by passing steam through it or washing it with hot or cold water: the solution is then evaporated to dryness, and placed in the well-known apparatus for subliming sal-ammoniac. When heat is applied, the hydrochlorate of ammonia will be sublimed, and caustic soda will remain in the retort. The mixture may be subjected to this operation in the state in which it comes from the gas-works, that is, without the salts being first washed out; in such case, the mixture remaining in the retort, after subliming from it the hydrochlorate of ammonia, will be soda and charcoal. The soda must now be washed out, and evaporated or crystallized. The damp charcoal, from which the salts of ammonia and soda have been separated, may be again mixed with chloride of sodium. The sublimed hydrochlorate of ammonia, obtained as above, may be sold in the market; or the charcoal may be mixed with the chloride of sodium, and placed in a retort, and the ammonia obtained by sublimation, mixed with rather more than its own weight of carbonate of lime, and placed in a second retort, connected with the former by a short and wide tube. A fire is to be lighted under the retort containing the ammonia and carbonate of lime, when the ammoniacal compound will be decomposed,—the hydrochloric acid combining with the lime, and the ammonia with the carbonic acid. The volatile carbonate of ammonia will pass over into the retort containing the charcoal and chloride of sodium, and the chloride of sodium will then be decomposed,—its chlorine combining with the ammonia, and the carbonic acid combining with the soda. The contents of the retort, which contained the ammonia and carbonate of lime, will now be chloride of calcium; and the contents of the retort which contains the charcoal must be treated as if the mixture had

taken up the ammonia from purifying the gas. This process may be a continuous one,—any little ammonia that may be lost in the process of manufacture being made good by a supply of the purifying mixture that has been used at the gas-works, or from a sulphate or chloride of ammonia of commerce. Instead of carbonate of lime being used in one of the retorts, as described, lime may be used; when caustic ammonia will pass over instead of a carbonate: in this case a continuous stream of carbonic acid must be conducted into the retort containing the charcoal and chloride of sodium, during the operation. Instead of using the purifying material which has been charged with ammonia from the purification of gas, a commercial chloride, or other salt of ammonia, may be used,—such ammonia being of the same weight as the chloride of sodium acted upon. The operation will be precisely the same,—the ammonia being always recovered, and capable of being used as often as may be required.

To WILLIAM EDWARD NEWTON, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in the manufacture of the carbonates of soda.*—[Sealed 8th November, 1852.]

IN carrying out his improvements, the inventor takes sulphate of soda, as obtained by any of the known processes, and reduces it to a coarse powder, and with this he mixes about one half its weight, more or less, of powdered coal, charcoal, sawdust, or other combustible matter. This mixture is subjected to a low red heat, in a suitable furnace, until the mass is melted, and thoroughly decomposed into sulphuret of sodium. It is then withdrawn from the furnace, and when cool enough, dissolved in water, and run into suitable air-tight vats, provided with pipes and stopcocks, and connected with each other in the manner known among chemists as Woolfe's apparatus; which vats, for greater convenience, are placed one above another. By an air-pump, or other suitable means, carbonic acid is then transmitted through the liquid in the series of vats, entering the lower ones first. It is preferred that this carbonic acid should be obtained from the escape gases from chimnies, or other parts of furnaces burning anthracite or other mineral coal, and especially from the chimnies of steam-boilers. The gases are first passed through water in a

suitable vessel, to remove ashes, smoke, or other dirt,—a little lime, carbonate of lime, or alkaline matter, being mixed with the water, in the said vessel, to absorb and remove any sulphurous acid, the presence of which would injure both apparatus and materials. It is found in practice that 1 lb of lime is sufficient for 10,000 cubic feet of gas.

The carbonic acid is transmitted through the liquid in the vats until the decomposition of sulphuret of sodium into carbonate of soda is found in the lower vat to be complete, which is easily known by suitable chemical tests; when it may be drawn off to be filtered and evaporated in the usual manner. The liquor in the upper vat is then to be brought into the lower one, and fresh liquor into the upper one, and the process repeated as before.

The patentee remarks, that any arrangement of apparatus may be used that will bring carbonic acid into intimate contact with sulphuret of sodium.

During the whole process, a constant stream of gases is escaping from a pipe in the upper vat, consisting of sulphuretted hydrogen, nitrogen, and other gases. The whole of the sulphur originally in the sulphate of soda is contained in the sulphuretted hydrogen, which may be recovered, or made into compounds of sulphur by means well known to chemists.

The process generally in use for making soda-ash consists in mixing 100 parts of sulphate of soda with 120 parts of carbonate of lime and 50 parts of coal, all in powder, and heating the mixture to a white heat in large furnaces; double decomposition will then take place, forming carbonate of soda and oxysulphuret of calcium. The mass is then raked out of the furnaces and allowed to cool; then powdered coarsely, and dissolved in water. The water extracts about 40 per cent. of the mass; and the rest is thrown away as useless. The liquors thus obtained are evaporated to dryness, and if too caustic (which is generally the case), they must be mixed with coal or sawdust, and again heated to redness; by which means the caustic soda becomes carbonated with carbonic acid, formed from the combustion of the coal. All the sulphur originally contained in the sulphate of soda is now in the insoluble mass, but cannot be extracted so as to pay, and is therefore lost. In practice, from 50 to 55 per cent. of the weight of sulphate of soda used is obtained as carbonate; it should yield 75 per cent.; but, from the high heat and incomplete decomposition, the rest is unavoidably lost.

The advantages of the improved plan over the common process for making soda-ash, as above-mentioned, are, 1st.—Not employing carbonate of lime in any form; of which, in the old plan, 10 tons, at least, are used for every 7 tons of soda-ash made. The first cost of the said carbonate of lime is very considerable; it requires to be finely powdered, and as hard limestone is generally used, this process is rendered very expensive. The carbonate of lime, which is added according to the old plan, also doubles the weight of matter to be heated, and therefore requires twice as much fuel, and twice as large furnaces, as when the improved process is employed. It also requires a much higher temperature to be maintained for a long period. In consequence of some of these inconveniences and objections, which are incidental to the old plan, a saving of about 75 per cent. in fuel, in addition to the saving of the cost of the carbonate of lime, is effected by the improved process. 2nd.—Most, if not all of the sulphur originally used in making the sulphuric acid consumed in the manufacture of sulphate of soda, can, in the improved process, be recovered from the sulphuretted hydrogen, by well-known means, and at little or no expense; but, in the old process, all the sulphur is lost, being united with the lime in the form of oxysulphuret of calcium, for which no use exists, and from which the sulphur cannot be separated excepting at a greater cost than it is worth. The sulphur recovered by the improved process effects a saving of about 20 per cent. on the cost of the soda-ash. 3rd.—The yield of soda-ash is greater, and its quality better, by the improved process; the great bulk of insoluble matter (occurring when the common plan is pursued) rendering it impossible to extract all the soda from it; but, in the improved plan, all is soluble, except a very small quantity of coal used in excess.

If bicarbonate of soda, or "soda salaratus" as it is called when impure, is to be made, the solution of carbonate of soda, obtained from the vats wherein the sulphuret of sodium is converted into carbonate, by means of carbonic acid, as previously described, is filtered, and boiled down until the carbonate of soda separates from the liquor, as a crystalline powder, consisting of one equivalent of real carbonate of soda united with one equivalent of water; or, if thought desirable, commercial soda-ash or sal-soda may be dissolved in water, and substituted for the solution spoken of above.

The powder of carbonate of soda, above mentioned, is ladled out of the liquor, drained, and allowed to cool. This is coarsely powdered and spread upon frames, which are piled one upon another in air-tight chambers. When the chambers are full, the openings are closed, except a vent at the top; and carbonic acid, by preference, obtained and purified, as mentioned in the preparation of soda-ash, is forced into them until the saturation is complete; when the soda will be found to have absorbed a second equivalent of carbonic acid, forming bicarbonate of soda or soda-salaratus, when not pure. The bicarbonate of soda is then taken out, dried, and powdered.

In the processes heretofore in use for making bicarbonate of soda, the crystals of sal-soda ($NaO \cdot CO^2 + 10aq$) are dissolved in water, and carbonic acid passed through the solution until the soda is bicarbonated. Part of the bicarbonate thus formed is deposited from the solution in a crystalline form, and more may be obtained by evaporating the mother liquor at a low temperature. Another plan, in use for making bicarbonate of soda, is to put the crystals of sal-soda into a suitable vessel, and then to pass carbonic acid into the vessel until the bicarbonation is complete; or, lastly, to take a mixture of effloresced and crystallized sal-soda, in the proportion of four of the former to one of the latter, and subject the mixture to the treatment with carbonic acid, as above. In the above processes the first has been generally abandoned, from the difficulty of effecting a complete bicarbonation from the small product obtained from the great quantities operated upon, and from the loss of time attending the slow concentration of the mother liquor, which is unavoidable, as the bicarbonate in solution is decomposed at a boiling temperature. In the second process, which is the one generally in use, the bicarbonation is complete; but, as sal-soda contains 10 equivalents of water, of which only one is retained by the bicarbonate, the remaining nine equivalents of water are set free, and drain off from the crystals; holding so large a quantity of carbonate of soda in solution, that not more than half of the bicarbonate is obtained; the rest remaining in the mother liquors, mostly in the form of sesquicarbonate, from which it cannot be obtained without great loss. In the third and last process, the difficulty arising from the presence of water of crystallization is removed, by exposing the crystals to a dry atmosphere, by which means all, or nearly all, the

water is lost by efflorescence. The peculiar disadvantage of this plan is the enormous loss of time and labour attending the efflorescence of the sal-soda, which is necessarily a very tedious operation, since a temperature much over 100° Fahr., will cause the crystals to melt in their water of crystallization, instead of efflorescing; thus rendering the manufacture of bicarbonate in large quantities very expensive by this process. In all of the above plans sal-soda is used directly or indirectly; the preparation of which is a heavy expense in the manufacture of bicarbonate of soda.

The advantages supposed to be derived from the improved processes are, 1st.—The saving of time and money attending the preparation of sal-soda, which has always heretofore been used for preparing bicarbonate of soda. 2nd.—The preparation of the mono-hydrated carbonate of soda directly from the solutions of crude carbonate of soda,—thereby avoiding even part of the expenses that necessarily attend the drying down of these solutions into soda-ash. 3rd.—The employment of the mono-hydrated carbonate of soda for the manufacture of bicarbonate of soda,—thereby obtaining bicarbonate of soda, better and cheaper than it can be made from any other known material. 4th.—The employment and purification (as above mentioned) of carbonic acid, obtained from the combustion of anthracite or other mineral coal, in combination with the aforesaid processes,—thereby avoiding the expense attending the employment of carbonate of lime and sulphuric or muriatic acid, which have been generally used for procuring the said carbonic acid.

The patentee claims, Firstly,—the decomposition of sulphuret of sodium, by carbonic acid, for making soda-ash and other preparations of carbonate of soda. Secondly,—the preparation and use of the mono-hydrated carbonate of soda for the manufacture of bicarbonate of soda and soda-salaratus. And, Thirdly,—in combination with each of the above, the employment and purification of carbonic acid, derived from the combustion of coke, anthracite, or other mineral coal, for the manufacture of the carbonates of soda, substantially in the manner herein specified.

Scientific Notices.

THE NEW PATENT LAW.

The hasty manner in which the Patent Law Act of last year was finally passed, after dragging listlessly through nearly an entire Session of Parliament, rendered it a matter of certainty that a supplemental Act would be required, to modify or enlarge some of its provisions. This, the Session which has just closed has afforded us; and we are now enabled to congratulate both inventors and the public on some important amendments in the law of patents, affecting their interests. In the first place, the Commissioners are empowered to certify printed or manuscript copies or extracts of specifications, and thereby render them legal evidence in all courts of law. It is obvious that this arrangement will greatly facilitate the production of evidence in trials for the infringement of patents, by reducing the cost of office copies to the smallest possible amount; and yet avoid the objection that militated against a clause in the Act of last year, which made all copies issued by the Queen's printer admissible as evidence, no matter what the errors in the letter-press, or how imperfect soever the lithographed representations of the colored drawings filed by the patentee with his engrossed specification. Another important feature in the new Act is, that, whereas the former Act ordered that all specifications should be printed and published, but omitted to limit the period in which this "consummation devoutly to be wished" should be realized, the law of 1853 enacts that certified copies of all specifications hereafter to be filed in the office of the Commissioners, shall be transmitted to Edinburgh and Dublin within twenty-one days of the date of such filing. We find no penalty annexed for the omission of this duty, but we have reason to believe that arrangements have been made for its fulfilment; and the public may therefore confidently expect to receive within a few days an instalment of the debt which was contracted by the Commissioners on the 1st October last. But perhaps the most important provision of the new Act remains to be noticed. It is to the effect that, in case a specification has not been filed within the time limited by the letters-patent, and such delay has been occasioned by accident, the Lord Chancellor shall have power to extend the time of filing to a period not exceeding one month. This is a most liberal and prudent provision, and we trust it will be the precursor of a rule which it is in the power of the Commissioners to make, viz.,—that any party holding a

power of attorney from a patentee may be enabled to go through the formality of signing and sealing his specification. By the adoption of this simple regulation, the necessity which now exists, in cases where the inventors are residing abroad, for obtaining patents in the name of patent agents and others, having no pecuniary interest therein, would no longer exist, and thus the expense of transfer deeds would be avoided. The following is a copy of the new law:—

Whereas it is expedient to amend certain provisions of the Patent Law Amendment Act, 1852, in respect of the transmission of certified copies of letters patent and specifications to certain offices in Edinburgh and Dublin, and otherwise to amend the said act: be it therefore enacted, by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

I. Section thirty-three of the said Act, and such part of section twenty-eight of the said Act as directs that in case reference is made to drawings in any specification deposited or filed under the said Act, an extra copy of such drawings should be left with such specification, shall be repealed.

II. The Commissioners shall cause true copies of all provisional specifications left at the office of the Commissioners to be open to the inspection of the public, at such times after the date of the record thereof respectively as the Commissioners shall by their order from time to time direct.

III. A true copy, under the hand of the patentee or applicant, or agent of the patentee or applicant, of every specification, and of every complete specification, with the drawings accompanying the same, if any, shall be left at the office of the Commissioners on filing such specification or complete specification.

IV. Printed or manuscript copies or extracts, certified and sealed with the seal of the Commissioners, of letters patent, specifications, disclaimers, memoranda of alterations, and all other documents recorded and filed in the Commissioners' office, or in the office of the court of chancery appointed for the filing of specifications, shall be received in evidence in all proceedings relating to letters patent for inventions in all courts whatsoever within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, and Her Majesty's colonies and plantations abroad, without further proof or production of the originals.

V. Certified printed copies, under the seal of the Commissioners, of all specifications and complete specifications, and facsimile printed copies of the drawings accompanying the same, if any, disclaimers, and memoranda of alterations filed, or hereafter to be filed under the said Patent Law Amendment Act, shall be transmitted to the office of the director of chancery in Scotland, and to the enrolment office of the court of chancery in Ireland,

within twenty-one days after the filing thereof respectively, and the same shall be filed in the office of chancery, in Scotland and Ireland respectively; and certified copies or extracts from such documents shall be furnished to all persons requiring the same, on payment of such fees as the Commissioners shall direct; and such copies or extracts shall be received in evidence in all courts in Scotland and in Ireland respectively, in all proceedings relating to letters patent for inventions, without further proof or production of the originals.

VI. Where letters patent have not been sealed during the continuance of the provisional protection on which the same is granted, provided the delay in such sealing has arisen from accident, and not from the neglect or wilful default of the applicant, it shall be lawful for the Lord Chancellor, if he shall think fit, to seal such letters patent at any time after the expiration of such provisional protection, whether such expiration has happened before, or shall happen after the passing of this Act, and to date the sealing thereof as of any day before the expiration of such provisional protection, and also to extend the time for the filing of the specification thereon; and where the specification, in pursuance of the condition of any letters patent, has not been filed within the time limited by such letters patent, provided the delay in such filing has arisen from accident, and not from the neglect or wilful default of the patentee, it shall be lawful for the Lord Chancellor, if he shall think fit, to extend the time for the filing of such specification, whether the default in such filing has happened before, or shall happen after the passing of this Act: provided always, that, except in any case that may have arisen before the passing of this Act, it shall not be lawful for the Lord Chancellor to extend the time for the sealing of any letters patent, or for the filing of any specification, beyond the period of one month.

VII. And whereas doubts have arisen whether the provision of the Patent Law Amendment Act, 1852, for the making and sealing new letters patent for a further term, in pursuance of Her Majesty's order in council, in the cases mentioned in section forty of the said Act, extends to the making and sealing of new letters patent in the manner by such Act directed where such new letters patent are granted by way of prolongation of the term of letters patent, issued before the commencement of the said act: and whereas it is expedient that such new letters patent granted by way of prolongation shall be granted according to the provisions of the said Patent Law Amendment Act: be it declared and enacted, that where Her Majesty's order of council for the sealing of new letters patent shall have been made after the commencement of the said Act, the said provision of the said Act for making and sealing in manner aforesaid of new letters patent shall extend, and shall, as from the commencement of the said Act, be deemed to have extended to the making and sealing in manner aforesaid of new letters patent for a further term, as well where the original

letters patent were made before, as where such original letters patent have been issued since, the commencement of the said Act.

VIII. This Act, and the Patent Law Amendment Act, 1852, shall be construed together as one Act.

Annexed is the draft of a rule, which, in substance may be expected to issue shortly from the office of the Commissioners, to determine the practice relating to copies of specifications filed under the new law.

All copies of specifications directed by the Act 16 and 17, Vic., c. 115, sec. 3, to be left at the office of the Commissioners, on filing the specification, shall be written upon sheets of foolscap paper, briefwise, and upon one side only of each sheet. The copy of drawings (if any) left with the same, must be made as heretofore, and according to Rule III. of the 1st October, 1852.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Cases in which a full Specification has been deposited.*]

1789. John Carvalho de Medeiros, of Passy, near Paris, for improvements in the means or processes for preserving metals from corrosion,—being a communication.—[*Dated August 1st.*]

1814. Charles Frederick Stansbury, of Pall-mall, for certain improvements in machinery for tempering clay and pressing or converting it into bricks,—being a communication.—[*Dated August 3rd.*]

[*Cases in which a Provisional Specification has been deposited.*]

1000. John Coope Haddan, of Chelsea, for improvements in the manufacture of cartridges, and of wads or wadding for fire-arms.—[*Dated April 26th.*]

1260. Henri Joseph Scoutetten, of Metz, France, for an improved plastic compound, applicable to various ornamental and useful purposes.—[*Dated May 21st.*]

1290. Edward White, of Ipswich, for improvements in arrangements for supplying water to towns or other places.—[*Dated May 26th.*]

1330. William Green, of Islington, for improvements in treating or preparing yarns or threads,—[*Dated May 30th.*]

1337. Hesketh Hughes and William Thomas Denham, both of Cottage-place, City-road, for improvements in piano-fortes.—[*Dated May 31st.*]

1388. John Walter Friend, of Canute-road, Southampton, for an improved method of measuring and registering the distance run by ships and boats proceeding through the water, which is also applicable to measuring and registering tides and currents.—[*Dated June 6th.*]

1399. Alexander Mc Dougall, of Manchester, for improvements in the manufacture of potash and soda ash.—[*Dated June 7th.*]

1480. James Hogg, Jun., of Nicholson-street, Edinburgh, for improvements in the application and combination of glass, porcelain, stoneware, earthenware, terra-cotta, composition in plaster, of the kind called scagliola, and majolica ware.—[*Dated June 17th.*]

1485. Guy Hannington, of Holland-place, Coldharbour-lane, Surrey, for improvements in producing railway and other tickets and cards.

1487. Jacques François Dupont de Bussac, of Upper Charlotte-street, for an improved mode of making with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations,—being a communication.

The above bear date June 18th.

1512. Joseph Skertchly, jun., of Kingsland, for improvements in the application of baths to articles used for resting the human body.—[*Dated June 20th.*]

1531. Peter Armand Le Comte de Fontainemoreau, of South-street, for a new distilling apparatus,—being a communication.—[*Dated June 23rd.*]

1569. John Imray, of Lambeth, for improvements in obtaining motive power.—[*Dated June 29th.*]

1596. François Mathieu de Amezaga, of Bordeaux, for a method of obtaining motive power, and certain machinery or apparatus employed therein.—[*Dated July 4th.*]

1611. William Woods Cook, of Bolton, for improvements in the manufacture of woven or textile fabrics.—[*Dated July 6th.*]

1634. James Parkes and Samuel Hickling Parkes, both of Birmingham, for improvements in the manufacture of certain drawing or mathematical instruments; also in packing or fitting the same in their cases; which said improvements in packing or fitting are also applicable to the packing or fitting of other articles.—[*Dated July 9th.*]

1645. George Ager, of Witham, Essex, for an apparatus for holding and turning over the leaves of music or music books.

1649. Henry Brougham Hopwood, of St. George-street East, for improvements in ships' ports or scuttles.

The above bear date July 11th.

1653. William Levesley, of Sheffield, for an improved method of making table knife blades.

1655. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the preparation of glycerine, and in its applications,—being a communication.

1657. Martin Samuelson, of Hull, for improvements in the manufacture of bricks and other articles from plastic materials.

1659. William Francis Snowden, of Weymouth, for an improved mangle.

The above bear date July 12th.

1661. Henry Montague Grover, of Hitcham Rectory, Buckinghamshire, for a new method of finding and indicating the measurements of the sines and cosines of the arcs of circles or other peripheries.

1663. Thomas Hill Bakewell, of Dishley, Leicestershire, for improvements in ventilating mines.

1664. William Williams, of Fetter-lane, for improvements in electric telegraphic instruments.

1665. John Loude Tabberner, of North Brixton, for improvements in the manufacture of iron.

1666. Frederic Ransome, of Ipswich, for improvements in the manufacture of artificial stone and similar wares.

1667. Arnold Morton, of Cockerill's-buildings, Bartholomew-close, London, for improvements in the manufacture of paints, pigments, and materials for house-painting, paper-staining, and decorative purposes generally.

1668. Alfred Fryer, of Manchester, for certain improvements in the construction of apparatus for reburning animal charcoal.

The above bear date July 13*th.*

1669. William Needham, of Smallbury-green, and James Kite, jun., of Lambeth, for improvements in machinery and apparatus for expressing liquid or moisture from substances.

1671. Augustino Carosio, of Genoa, for a new or improved electro-magnetic apparatus, which, with its products, is applicable to the production of motive power.

1672. William Henderson, of Bow-common, for improvements in the construction of furnaces for the purpose of obtaining products from ores.

1673. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of anvils,—being a communication.

1675. George Humphery, of Brighton, for improvements in regulating the supply of water for water-closets.

1676. Robert Smith Bartleet, of Redditch, for improvements in the manufacture of sewing-machine needles.

1677. John Yule, of Glasgow, for improvements in rotatory engines.

1678. William Little, of the Strand, for improvements in the manufacture of lubricating matters.

1679. Benjamin Looker, jun., of Kingston-on-Thames, for improvements in the manufacture of bricks.

The above bear date July 14*th.*

1680. James Nasmyth, of Patricroft, near Manchester, for certain improvements in the machinery and apparatus employed in rolling plates and bars of iron and other metals.

1681. George Gowland, of Liverpool, for improvements in certain nautical and surveying instruments.

1682. Robert Gordon, of Heaton Norris, for improvements in furnaces used with steam-boilers for the purpose of consuming smoke and economising fuel.

1683. Henri Joseph D'Huart, of Longwy, France, for certain improvements in the manufacture of pottery.

1685. Charles Liddell, of Abingdon-street, for improvements in moving boats on canals and rivers.

1686. Henry Nathan, of Birmingham, and Solomon Elsner, of Exeter, for an improvement in spectacle and reading glasses and pebbles.

1687. Henry Bessemer, of Old St. Pancras-road, for improvements in the process of refining and manufacturing sugar.

1688. Charles Goodyear, of St. John's Wood, for improvements in spreading or applying India-rubber or compositions of India-rubber on fabrics.

1689. Henry Bessemer, of Old St. Pancras-road, for improvements in the manufacture and treatment of bastard sugar and other low saccharine products, such as are obtained from molasses and scums.

1690. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of brushes and substitutes for bristles.

1691. Henry Bessemer, of Old St. Pancras-road, for improvements in the manufacture and refining of sugar.

1692. Isaac Taylor, of Stanford Rivers, Essex, for improvements in machinery for printing.

1693. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of pens, pencils, and instruments used when writing, marking, and drawing.

1694. Chárles Goodyear, of St. John's Wood, for improvements in preparing India-rubber.

1695. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of beds, seats, and other hollow flexible articles to contain air.

1696. Jean Baptiste Jelie, of Alost, Belgium, for improved machinery for dressing or polishing thread.

1697. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in machinery or apparatus for digging, excavating, and removing earth,—a communication.

The above bear date July 15*th.*

1698. Edmund Reynolds Fayerman, of Shaftesbury-crescent, for a method of and instrument for keeping time in music.

1699. Henry Lamplough, of Gray's-inn-lane, for improvements in the preparation and manufacture of certain effervescing beverages.

1700. Jacques Rives, of Rue Motay, Paris, for improvements in trusses for the cure or alleviation of hernia.

1701. Benjamin Burrows, of Leicester, for improvements in Jacquard apparatus.

1702. James Naylor, of Hulme, for improvements in lamps.

1703. Samuel Colt, of Spring-gardens, for improved machinery for boring metals,—being partly a communication.

1704. Marie Gabriel Adrien Edouard le Coat de Kervéguen, of

Paris, for an improved construction of wheel for motive power and propelling purposes.

1705. John Wallace Duncan, of Grove-end-road, St. John's-wood, for improvements in adhesive soles and heels for boots and shoes, and in apparatus used for preparing and applying the same.

The above bear date July 16*th.*

1706. Isaie Alexandre, of Bruxelles, for improvements in metallic pens and pen-holders.

1707. William Boggett, of St. Martin's-lane, and William Smith, of Margaret-street, for improvements in machines for cleaning and polishing knives.

1708. Peter Armand Le Comte de Fontainemoreau, of South-street, for a new mode of equilibrating indefinitely the weight of atmospheres,—being a communication.

1709. Thomas Wood and George Wade, both of Sowerby Bridge, Yorkshire, for improvements in machinery or apparatus for opening, cleaning, carding, or otherwise preparing cotton, or other fibrous materials to be spun.

1710. Samuel Perkes, of Walbrook, London, for improvements in the construction of portable metallic folding bedsteads, chair-bedsteads, chairs, sofas, couches, settees, and such like articles for the use of emigrants and others; and part of which improvements are applicable to ordinary bedsteads, sofas, couches, chairs, and such like articles in general.

The above bear date July 18*th.*

1712. Peter Armand le Comte de Fontainemoreau, of South-street, for a new mode of fastening buttons to garments, and an improved button, and also in machinery for manufacturing the same,—being a communication.

1713. Richard Dart, of Bedford-street, Covent-garden, and Edward Silverwood, of the same place, for the adaptation of loom machinery to the purposes of embroidery for badges worn by the police, railway officials, and other officers, and which require a succession of figures.

1714. Charles Breese, of Birmingham, for a method of forming designs and patterns upon papier-maché, japanned iron, glass, metal, and other surfaces.

The above bear date July 19*th.*

1715. John Robison, of Coleman-street, for a new or improved apparatus for making tea and coffee and other infusions or decoctions for chemical and other purposes.

1716. Moses Poole, of Avenue-road, Regent's park, for improvements in gas regulators,—being a communication.

1717. Edwin Dalton Smith, of Hertford-street, May Fair, for improvements in crushing and washing ores and earths.

1718. James Shield Norton, and Henry Jules Borie, of Union

Works, New Park-street, Southwark, for improvements in the manufacture of tiles and stairs from plastic materials.

1719. John Dent Goodman, of Birmingham, for improvements in lanterns.

1720. Philippe Poirier de St. Charles, of Fulham, for improvements in stopping and starting vehicles.

1721. Alexander Cochran, of Kirkton Bleach Works, Renfrew, for improvements in finishing muslin and other fabrics.

1722. James Mills, of Lower Brook-street, for improved machinery for propelling carriages.

The above bear date July 20th.

1723. John Lilley, of Thingwall, Cheshire, for separating the refuse vegetable matter contained in the stalk and leaves of the plantain species, and also trees grown in tropical climates from the fibrous material of the same, in order that the latter may be manufactured into ropes or cordage; and for other purposes for which hemp and flax are used.

1724. William Birkett, of Bradford, Yorkshire, for a method of cleansing or purifying and treating soap-suds or wash-waters, so as to fit them to be again used for the washing of wools and other similar matters.

1725. Simon Charles Mayer, of Paris, for an improved domino bearer.

1726. William Thorp, of Collyhurst, near Manchester, for certain improvements in machinery for finishing and embossing plain and fancy woven fabrics.

1728. Edward Cockey, Henry Cockey, and Francis Christopher Cockey, of Frome, Somersetshire, for improvements in the manufacture or production of cheese.

The above bear date July 21st.

1729. James Murdoch, of Staple-inn, for an improvement in stamping or shaping metals,—being a communication.

1730. Alexander Isaac Austen, of Trinity-place, Wandsworth-road, for improvements in the apparatus used in the manufacture of mould candles.

1731. Thomas Gray and John Reid, both of Newcastle, for an improved mode of manufacturing files and rasps.

1732. John Gillam, of Woodstock, for improvements in apparatus for cleansing and separating corn, grain, and other seeds.

1733. George Spencer, of Manor-road, Walworth, for improvements in springs for carriages.

1734. Mary Ann Rylands, of Kingston-upon-Hull, for improvements in yards and spars of ships and other vessels,—being a communication.

The above bear date July 22nd.

1735. Charles William Manby, of Grove-villas, Finchley, for an improved shaving-brush, to be called "the traveller's patent shaving-brush."

1736. William Huntley, of Ruswarp, near Whitby, for improvements in engines worked by steam, air, or fluids.
1737. Auguste Buisson Lalande, of Bordeaux, for certain improved means for preventing accidents on railways.
1738. Frederick Warner and John Lee, of the Crescent, Jewin-street, for improvements in water-closets and urinals.
1739. John Hall, of Bedford, for an improved mangle.
1740. James Murdoch Napier, of York-road, Lambeth, for improvements in letter-press and other raised surface printing machines.
1741. Samuel Barlow, of Stakehill, Lancashire, and John Pendlebury, of Crumpsall, for certain improvements in machinery or apparatus for bleaching or cleansing textile fabrics or materials.

The above bear date July 23rd.

1742. Joseph Bennett Howell, of Sheffield, and William Jamieson, of Ashton-under-Lyne, for an improvement or improvements in the manufacture of saws.
1743. Joseph Aristide Furst de Rostin, of South-street, for a new mode of constructing floating bodies.
1744. Alexander Clark, of Gate-street, Lincoln's-inn-fields, for improvements in regulating the speed and indicating the power of steam and other motive power-engines.
1745. William Ireland, of Leek, Staffordshire, for improvements in the mode or method of melting or fusing iron or other metals, and in the apparatus employed therein.
1746. James Collins, of Oxford, for improvements in the manufacture of paper.
1747. Robert Bitten, of Dartford, for improvements in apparatus for ascertaining and indicating the supply of water in steam-boilers.
1748. Warren de la Rue, of Bunhill-row, for means of treating and preparing certain tar or naphtha, and applying products thereof.
1749. John Ferguson, of the Heathfield Brick and Pottery Works, Glasgow, for improvements in kilns for baking or burning clay.
1750. Charles Frederick Spieker, of New York, for improvements in generating and fixing ammonia.
1751. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery or apparatus for stopping cables,—being a communication.
1752. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of cutting tools,—being a communication.

The above bear date July 25th.

1753. John Dawson, of Linlithgow, Scotland, for a new instrument or apparatus for the purpose of preventing fraud in drawing off liquids.
1754. Frederick Cole, of High-street, Camden Town, for an improvement of the lithographic press.

1755. Frederick Cole, of High-street, Camden Town, for facilitating and improving the process of inking in printing.

1756. Alfred Walter Money, of Chudleigh, Devonshire, for an improved bridle.

1757. Thomas Banks, of Derby, and Henry Banks, of Wednesbury, for improvements in apparatus for retarding and stopping railway trains; which improvements are also applicable to vehicles travelling on common roads.

1758. Thomas Buxton, of Malton, Yorkshire, for an improved mill for grinding.

1759. Farnham Maxwell Lyte, of Florian, Torquay, for improvements in obtaining iodide of potassium when treating certain metals.

1760. Joseph Barrans, of Peckham-lane, Deptford, for improvements in steam-boilers.

1761. John Giblett, of Trowbridge, for improvements in the manufacture of woollen cloth and other fabrics.

1762. Lansing E. Hopkins, of New York, for the manufacture of hat-bodies of fur and other like substances.

1763. Alfred William Warder, of Sydney-street, Brompton, for improvements in gas-stoves.

The above bear date July 26th.

1764. Francis Arding, of Uxbridge, for improvements in threshing machines.

1765. John Knowles, of Manchester, for certain improvements in looms for weaving.

1766. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in the manufacture of tiles for roofing,—being a communication.

1767. Ange Louis du Temple de Beaujeu, of Paris, for improvements in rotatory engines.

The above bear date July 27th.

1768. Edward Herring, of Southwark, for improvements in the manufacture of sulphate of quinine.

1769. Charles Cummins, of Leadenhall-street, London, for an invention for improving clock escapements.

1770. John Fordham Stanford, of Arundel-street, for an improvement in the method of draining dwelling-houses, and open and enclosed spaces in cities and towns, where sewers and drains are now or may be hereafter constructed.

1771. Thomas Forster, of Streatham, for improvements in the manufacture of boots and shoes.

1772. Benjamin Collins Brodie, jun., of Albert-road, Regent's-park, for improvements in treating or preparing black lead.

The above bear date July 28th.

1773. Theodore Dethier, of Pimlico, for an improved machine for mortising, drilling, and boring.

1774. Griffith Jarrett, of London, for improvements in machinery or apparatus for stamping or printing colored surfaces.

1775. James Edward McConnell, of Wolverton, for improvements in steam-engines and boilers for marine purposes.

1776. James Mackay, of Aigburth, near Liverpool, for improved apparatus for propelling vessels.

1777. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improvements in depositing metals or alloys of metals,—being a communication.

1778. William Wild, of Salford, for improvements in machinery or apparatus for covering rollers used in the manufacture of cotton and other textile materials, with leather, cloth, or other substances.

The above bear date July 29th.

1779. William Thomas Henley, of St. John-street-road, London, for improvements in modes of protecting wires for telegraphs.

1780. George Katz Douglas, of Chester, for certain improvements in the permanent way of railways.

1781. William Woods Cook, of Bolton, for improvements in the manufacture of woven fabrics and in the apparatus employed therein.

1782. George Ambler, of Settle, Yorkshire, for certain improvements in machinery for preparing for spinning cotton, wool, and other fibrous substances.

1783. Patrick Ramsay, of Glasgow, for improvements in the construction of tents.

1785. Peter Armand le Comte de Fontainemoreau, of South-street, for an improved mode of producing an electric current,—being a communication.

The above bear date July 30th.

1786. John Buchanan, of Leamington Priors, for improvements in propelling vessels.

1787. Henry Cadell, of Dalkeith, for a reaping machine.

1790. John Gray, of Rotherhithe, for improved apparatus for consuming smoke.

1791. Philipp Schäfer and Frederick Schäfer, of Brewer-street, for an improvement in travelling-bags.

1792. James Pudney Tracy, of Salisbury, and John Hart Tracy, of Old-street, for improvements in cutting, reaping, and gathering machines.

1793. John Shae Perring, of Bury, for improvements in the permanent way of railways.

1795. Augustus Russell Pope, of Massachusetts, America, for a new and useful or improved electro-magnetic alarm apparatus, to be applied to a door or window, or both, of a dwelling-house or other building, for the purpose of giving an alarm in case of an attempt to open said door or window.

1796. Robert Griffiths, of Mornington-road, Regent's-park, for improvements in the manufacture of rivets and bolts.
1797. Charles May, of Great George-street, Westminster, for improvements in the manufacture of bricks.
1798. Richard Holme, of Kingston-upon-Hull, for improvements in the manufacture of gas.
1799. Henry Purser Vaile, of Claydon Farm, Ashchurch, near Tewkesbury, for improvements in reaping machinery.

The above bear date August 1st.

1800. John Bothams, of Gravesend, for improvements in the manufacture of wheel tyres for locomotive engines and other carriages.
1801. John Griffiths, of Stepaside Saunderfoot, near Tenby, for certain improvements in steam-engines.
1802. William Perks, Jun., of Birmingham, for a new or improved tap for drawing off liquids.
1803. William Lanphir Anderson, of Norwood, for an improved propeller, and method of driving the same.
1805. Antoine Joseph Quinche, of Paris, for an improved apparatus for measuring distances travelled over by vehicles.
1806. Peter Armand Le Comte de Fontainemoreau, of South-street, for an improved mode of regulating the electric light,—being a communication.
1808. Matthias Edward Boura, of Crayford, for improvements in supplying ships or other vessels with water, air, or ballast.
1809. George Richardson, of Gutter-lane, Cheapside, for improvements in stoves for warming or heating buildings.

The above bear date August 2nd.

1810. Thomas Atkins, of Oxford, for improvements in transmitting power and communicating motion to agricultural implements.
1811. Joseph Clisild Daniell, of Bath, for an improvement or improvements in preparing food and litter for cattle, pigs, and other animals.
1812. John Slack, of Manchester, for improvements in reeds for looms.
1813. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for cutting card-board, paper, and other similar materials,—being a communication.
1815. William Sargeant Roden and William Thomas, both of Ebbw Vale Iron Works, for improvements in rolling metals.
1816. John Macintosh, of Pall-mall, for improvements in the construction of bridges, viaducts, and other like structures.
1817. Aristide Michel Servan, of Philpot-lane, London, for improvements in the manufacture of soap.
1818. James Billings, of Greenwich, for improvements in roofing biuldings.

1819. John Cumming, of Glasgow, for improvements in printing shawls, handkerchiefs, piece-goods, paper-hangings, and similar materials, and in the apparatus connected therewith.

The above bear date August 3rd.

1820. William Hickson, of Carlisle, for improvements in canal and river navigation, and in vessels to be used in such navigation, and in the mode of propelling the same.

1821. Charles Hill Snell, of the Triangle, Hackney, for improvements in the manufacture of soap.

1822. George Armitage, of Bradford, Yorkshire, for improvements in the construction of presses.

1823. Charles Butler Clough, of Tyddyn, Flintshire, for improvements in machinery or apparatus for washing, scouring, cleansing, or steaming woven fabrics, either in the piece or garment; also felts or fibrous substances, and corn, roots, seeds, or similar matters.

1824. Richard Brown Roden, of Abersycham Iron Works, near Newport, Monmouthshire, for improvements in rolling iron and all other malleable metals and alloys.

1825. Thomas Moss, of Gainford-street, Islington, for improvements in printing bank notes, cheques, bills of exchange, and other documents requiring like security against being copied.

1826. Barthelemy Louis François Xavier Fléchelle, of Paris, for certain improvements in the means of carrying, bedding, and bathing the injured, ill, or invalid persons.

1827. George Fergusson Wilson, of Belmont, Vauxhall, and Alexander Isaac Austen, of Trinity-place, Wandsworth-road, for improvements in the apparatus used in the manufacture of mould candles.

The above bear date August 4th.

1829. William Smith and Thomas Phillips, of Snow-hill, for an improved boiler.

1830. Richard Peters, of Southwark, for an apparatus or machine for ascertaining the distance traversed by cabs and other vehicles.

1832. Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, for improvements in fire-proof structures.

1833. William Garforthand James Garforth, of Dukinfield, for improvements in machinery or apparatus for manufacturing bricks.

1834. Robert Hunt, of Cottage-place, Greenwich, for an improved tile, and an improved method of making tiles.

1835. James Lee Norton, of Holland-street, Blackfriars, for improvements in obtaining wool from fabrics in a condition to be again used.

1836. William Newton, of the Office for Patents, Chancery-lane, for improvements in the process of coating cast-iron with other metals, and the alloys of other metals,—a communication.

The above bear date August 5th.

1837. Martin Zadick Just, of Manchester, for improvements in machinery for hulling and dressing paddy or rice,—being a communication.

1838. John Hughes, of Great George-street, for improvements in building or forming structures under water, or below the surface of the ground.

1839. John Marten, of High-street, Marylebone, for an improved shade for gas-burners and lamps.

1840. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in the combination of glass with iron or other metals, to serve for the construction of floors, walls, roofs, or parts thereof, or of windows for buildings; and also of translucent pavements, lights for subterranean apartments, and for any purpose for which a translucent medium possessing great strength is desirable,—being a communication.

1841. Richard Bartholomew Martin, of Suffolk-street, Haymarket, for an improved plate-warmer.

1843. Robert Morrison, of Newcastle-upon-Tyne, for improvements in apparatus for forging, shaping, and crushing iron and other materials, and for driving piles.

1844. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in transmitting power,—being a communication.

1845. John Green, of Queenhithe, for improvements in printing-machinery,—being a communication.

The above bear date August 6th.

1846. Richard Christy, of Fairfield, Lancashire, and John Knowles of the same place, for improvements in the manufacture of terry cloth, or other woven fabrics having looped surfaces, and in the machinery or apparatus connected therewith.

1847. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in horse-shoes,—a communication.

1848. William Hickson, of Carlisle, for improvements in the application of heat for baking and drying purposes, and in the generation of steam.

1849. Moses Poole, of Avenue-road, Regent's-park, for improvements in regulating the flow and pressure of gas, and other fluids,—being a communication.

The above bear date August 8th.

1850. Thomas Young Hall, of Newcastle-upon-Tyne, for improvements in combining glass with other materials.

1852. William Rowan, of Belfast, for improvements in looms for weaving, and apparatus connected therewith.

1854. Louis Hartog Bruck, of Mark-lane, for improvements in the construction of tunnels, sewers, drains, pipes, tubes, channels, and other like conduits, for hydraulic or pneumatic purposes.

The above bear date August 9th.

1856. Henry Peters, of Birmingham, for improvements in pens and pen-holders.
1858. James Burden, of Stirling, for an improved cock or tap.
1860. Jean Pierre Albert Galibert, of Paris, for an improved domestic telegraph.

The above bear date August 10*th.*

1866. John Rushbury, of Wolverhampton, for a new or improved lock.
1868. Thomas Dewsnup, of Manchester, for improvements in obtaining motive power.
1872. Henry Moore Naylor, of Montpelier-row, Birmingham, for improvements in affixing postage and other stamps.
1874. George Deards, of Harlow, Essex, for improvements in lamps.

The above bear date August 11*th.*

List of Patents

Granted for SCOTLAND, from the 22*nd July to the* 22*nd August,* 1853.

To Peter Armand Le Comte de Fontainemoreau, of South-street, Finsbury, for certain improvements in cutting schistus for slate,—being a communication.—Sealed 25th July.

John Reed Randall, of Newtyn East, county of Cornwall, farmer, for improvements in cutting and reaping machines.—Sealed 3rd August.

Joseph Addenbrooke, of Bartlett's-passage, Holborn, envelope manufacturer, for certain improvements in the manufacture of envelopes, and in machinery used therein.—Sealed 3rd August.

Antoine Victor Coutant, of Paris, iron-master, for an improved mode of partially hardening iron for various purposes.—Sealed 10th August.

Arad Woodworth and Samuel Mower, of Boston, United States, for improvements in machinery for manufacturing bricks and other articles of a similar character.—Sealed 12th August.

New Patents.

Sealed under Patent Law Amendment Act, 1853.

214. Louis Christian Koeffler, of Rochdale, for improvements in bleaching and dyeing.—January 28.
221. Richard Archibald Brooman, of Fleet-street, for improvements in cables,—being a communication.—January 28.
222. Henry Avins and George Tarplee, both of Birmingham, for a new or improved brick.—January 29.

224. John Standish, of Bolton, for improvements in machinery or apparatus used in the preparation of cotton, wool, flax, or other fibrous materials to be spun.—January 29.

230. John Ryall Corry and James Barrett Corry, of Queen Camel, Somersetshire, for a new and improved method of dressing lambskin leather, and cleaning the wool therefrom.—Jan. 29.

241. Jean Baptiste Lavanchy, of Tannige, Savoy, for improvements in the construction of collapsible frame-work of wood or iron, which may be employed for forming portable bedsteads, houses, parts of houses or bridges, and other similar structures, which may occasionally be required to be removed from place to place with facility, economy, and despatch.—January 29.

244. Thomas Knox, of Birmingham, for a new or improved rotatory heel for boots and shoes.—January 31.

247. Samuel Perkes, of Walbrook, City, for improvements in the mode of constructing certain works, applicable to aqueducts, viaducts, railways, canals, rivers, docks, harbours, lighthouses, breakwaters, reservoirs, tunnels, sea-walls, embankments, submarine foundations, and other useful purposes.—January 31.

248. Richard Palmer, of Bideford, for an invention which may be used for cutting turnips, mangold wurzel, carrots, and other roots, or for bruising them only, or reducing them to a pulp, and for mixing them with meal as may be required; and also for grinding or crushing apples for cider.—January 31.

259. William Pizzie, of Albourn, Wiltshire, for a railway-carriage-break.—January 31.

260. Marc Louis Adam Tarin, of Mount-street, Grosvenor-square, for an improved dustpan.—January 31.

261. Marc Louis Adam Tarin, of Mount-street, Grosvenor-square, for improvements in reflectors for diffusing light.—January 31.

262. James Comins, of South Moulton, for a clod crusher, land presser, or pulverizer.—January 31.

264. Charles Cattanach, of Aberdeen, for certain apparatus for measuring the human figure, and transferring the said measurement to cloth.—January 31.

265. John Pinkerton, of High-street, Borough, for a new mode of applying and combining ornamented glass in the manufacture of useful and ornamental articles.—January 31.

267. Charles Hadley, of Lower Hurst-street, Birmingham, for improvements in the construction and formation of granite and stone pavements and surfaces for carriage and railways.—January 31.

269. Eliezer Edwards, of Birmingham, for a new or improved bedstead, which may be used as a vehicle.—February 1.

281. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in life-boats and vessels of a similar nature,—being a communication.—February 2.

287. Ismael Isaac Abadie and Henri Lauret, of Paris, for an improved manufacture of parasols.—February 2.

290. Thomas Spiller and Anthony Crowhurst, of Red Lion-square, for an invention for propelling steam-vessels.—February 3.
291. Manoah Bower, of Birmingham, for a new or improved apparatus to prevent the throwing up of mud by the wheels of vehicles.—February 3.
292. John Heckethorn, of Marquis Villas, Canonbury, for an improved coloring matter for coating or covering the exterior or interior of buildings; some of the ingredients of which such coloring matter is composed being capable of conversion into size, paste, and ground-color, for priming or giving the first coat or covering to work intended to be colored with oil paint. —February 3.
293. William Scarlett Wright, of Pont-street, Belgrave-square, for an improved bath.—February 3.
294. George John Newbery, of East Greenwich, for improvements in hinges,—being a communication.—February 3.
295. John Bower, of Dublin, for improvements in and applicable to certain descriptions of engines for driving piles.—Feb. 3.
297. John Henry Johnson, of Lincoln's-inn-fields, for improvements in gas-burners, and in regulating the combustion of gas, —being a communication.—February 3.
306. George Winiwater, of Red Lion-square, for certain improvements in the application of explosive compounds.—February 4.
313. William Walker, of Manchester, for certain improvements in apparatus to be employed for the purposes of drying.—Feb. 4.
317. Thomas Peacock, of Ashton-under-Lyne, for certain improvements in weaving and in machinery for weaving hat plush and other cut piled fabrics.—February 5.
318. George Hewitson, of Bradford, for improvements in machinery or apparatus for measuring or indicating the length of yarn as it is spun or wound on bobbins or rollers.—Feb. 5.
319. Antoine Wollowicz, of Paris, for improvements in primers for fire-arms.—February 5.
321. Charles Frederic Werckshagen, of Barmen, Prussia, for certain improvements in the manufacture of carbonate of soda and potash.—February 5.
322. André Michel Massonnet, of Paris, for certain improvements in alloys of metal, and of other substances, and also in the application of the same to various useful purposes.—Feb. 5.
331. William Scott, Robert Brough, James Rinoe, all of Brighton, and Thomas Mann, of Stroud, Rochester, for improvements in steam-engines.—February 7.
334. Richard Archibald Brooman, of Fleet-street, for improvements in sail hanks for securing stay-sail jibs and other sails to their proper stays,—being a communication.—February 7.
335. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in the treatment of bituminous and asphaltic matters, rendering them applicable to various useful purposes,—being a communication.—February 8.

337. John Buchanan, of Leamington, for an improved propeller, as to affixing the blades in the boss, and affixing the bosses to the spindle or centre shaft, and in the mode of placing it, and in controlling, lowering, and detaching the same.—February 8.

338. Thomas Allan, of Adelphi-terrace, for improvements in protecting telegraph wires.— February 8.

339. Thomas Allan, of Adelphi-terrace, for improvements in galvanic batteries.—February 8.

340. Thomas Reynolds, of Singleton-street, Hoxton, Henry Reynolds, of Hoxton, and Stephen Reynolds, of Charles-street, Westminster, for improvements in the means of retarding the progress of carriages.—February 9.

345. William Birkett, of Manningham Mills, Bradford, for improvements in treating soap-suds or wash waters in which soap has been used.—February 9.

355. William Fulton, of Paisley, for improvements in the treatment, cleansing, or finishing of textile fabrics.—February 10.

371. George Winiwarter, of Red Lion-square, for improvements in fire-arms.—February 12.

376. William Pidding, of the Strand, for improvements in crushing, drilling, or otherwise treating ores, stone, quartz, or other substances in mining operations, and in the machinery or apparatus connected therewith.—February 12.

377. William Pidding, of the Strand, for improvements in the treatment of oleaginous, fatty, or gelatinous substances, for purifying, decolorizing, compounding, or clarifying the same. —February 12.

378. Charles Hadley, of Birmingham, for improvements in the means of communication between the passengers, guard, and driver of a railway train; parts of which improvements are apapplicable to communicating on vessels.—February 12.

382. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in the mode of giving flexibility to beds, sofas, seats, and other similar articles,—a communication.—February 14.

385. Francis Clarke Mouatis, of South-street, Finsbury, for an improved mode of raising water.—February 14.

387. William Clark, of Chancery-lane, for improvements in the manufacture of colors and paints,—being a communication.—February 15.

390. Benjamin Greening, of Manchester, for improvements in machinery for making fences and other similar articles of wire. —February 15.

393. George Stiff, of Brixton-hill, for certain improvements in manufacturing paper.—February 15.

408. Charles Sheppard, of Maesteg Iron Works, near Bridgend, for an improved stove and apparatus for heating air for blast purposes.—February 16.

413. James Murphy, of Newport, for improvements in the permanent way of railways.—February 17.

414. William Pidding, of the Strand, for improvements in the treatment and preparation of saccharine substances and in the machinery or apparatus connected therewith.—February 17.

426. William Darling, of Glasgow, for improvements in the manufacture of malleable iron and other metals.—February 18.

430. James Chadnor White, of Liverpool-street, for improvements in fastenings for harness; and which are also applicable to other like purposes.—February 19.

435. James Anderson, of Auchnagie, for improvements in obtaining motive power.—February 19.

441. James Mash, of Highfield-terrace, Kentish Town, and Joseph Sharp Bailey, of Keighley, for improvements in weaving machinery employed in the manufacture of textile fabrics, and in the manufacture of such fabrics.—February 21.

442. William Pidding, of the Strand, for improvements in coverings for the feet of bipeds or quadrupeds.—February 21.

443. Richard Farrant, of Pimlico, for an improved chimney-pot. —February 21.

444. Ezra Miles, of Soulbury, for improvements in railway brakes.—February 21.

445. Thomas Bell, of Bristol, and Richard Chrimes, of Rotherham, for certain improvements in valves, applicable to the receiving and discharging of water or other fluids.—February 21.

452. George Winiwarter, of Red Lion-square, for improvements in the manufacture of fire-arms.—February 22.

455. John Smith, of Uxbridge, for improvements in machinery for raising and forcing water and other fluids.—February 23.

462. Adam Cyrus Engert, of Mora-place, City-road, for improvements in joints for the sticks of parasols and other like purposes,—being a communication.—February 23.

463. John Green, of York-buildings, New-road, for the more economic, speedy, convenient, and, in every respect, superior system of cooking to any now in use, and which he designates "Green's economical self-basting cooking apparatus."—Feb. 24.

465. Henry Walmsley, of Failsworth, near Manchester, and Thomas Critchley, of the same place, for improvements in machinery or apparatus for retarding or stopping railway trains; which machinery or apparatus is also applicable as a signal or communication from one part of a train to the other.—Feb. 24.

470. Emile Adolphe Herrmann, of New Broad-street, London, for certain improvements in machinery for manufacturing woollen cloth,—being a communication.—February 24.

471. James Lawrence, of Colnbrook, for improvements in the drying or preparation of malt, meal, seeds, corn, and other grain.—February 24.

473. Francis Preston, of Manchester, for improvements in the

manufacture of certain parts of machinery to be used in preparing and spinning cotton or other fibrous materials.—Feb. 25.

474. John Hynam, of Wilson-street, Finsbury, for improvements in the mode of manufacturing wax or composition tapers, and in the machinery or apparatus for that purpose.—Feb. 25.

475. Benjamin Price, of Whitechapel, for certain improvements in the construction of furnaces or flues of steam-boilers, coppers, and other like vessels for heating or evaporating liquids. —February 25.

478. John Palmer De la Fons, of Carlton-hill, St. John's-wood, for improvements in applying skids or drags to omnibuses.—February 25.

480. Henry Martyn Nicholls, of Gower-place, for improvements in emission or re-action engines.—February 25.

482. John George Taylor, of King-street, Cheapside, for improvements in ornamental fastenings for dress.—February 25.

492. Robert Griffiths, of Great Ormond-street, for improvements in propelling vessels.—February 26.

500. Martyn John Roberts, of Woodbank, Gerard's Cross, for improvements in the manufacture of mordants or dyeing materials, which are in part applicable to the manufacture of a polishing powder.—February 28.

514. John McAdams, of Massachusetts, America, for improvements in machinery or apparatus for printing on leaves of books their designations, numbers, or devices, or those of their pages; which machinery or apparatus may also be used to advantage for printing designating numbers or devices on various other articles.—March 1.

516. Laurence Hill, jun., of Port Glasgow, for improvements in the production of motive power,—a communication.—Mar. 1.

532. Robert Barclay, of Montrose, for improvements in rotatory engines for obtaining motive power, and for transmitting aeriform bodies and fluids.—March 3.

579. Thomas James Perry, of the Lozells, Birmingham, for a new or improved method of constructing cornice poles, and picture and curtain rods, and other rods from which articles are suspended.—March 8.

622. Peter Armand Le Comte de Fontainemoreau, of South-street, for a new or improved apparatus for filtering liquids,—being a communication.—March 12.

646. Joseph Maudsley, of Lambeth, for improvements in screw propellers for ships and other vessels.—March 15.

656. Edward Nickels, of the Albany-road, Camberwell, for improvements in preparing lubricating matters,—being a communication.—March 16.

657. John Livesey, of New Lenton, for improvements in pile and looped fabrics, in cutting and finishing such fabrics, and in the machinery employed therein.—March 17.

668. Malcolm Baxter, of Glasgow, for improvements in steam-engines and pressure-regulating valves.—March 18.

694. John Barsham, of Kingston-upon-Thames, for improvements in apparatus for communicating between the guard and engine-driver, or other persons, in a railway train.—March 21.

723. Robert Walker, of Glasgow, for improvements in working and increasing the safety of railways.—March 24.

728. Thomas Smedley, of Holywell, for certain improvements in steam-boilers.—March 26.

737. Thomas James Perry, of the Lozels, Birmingham, for improvements in printing.—March 28th.

746. Samuel Newton, of Stockport, for a self-acting friction brake to be applied to engines, carriages, and waggons used on railways.—March 29.

822. Edward Simons, of Birmingham, for improvements in telegraphing or communicating signals.—April 6.

824. James Jerram Pratt, of Long Eaton, for certain improvements in stockings.—April 6.

826. Henry Alfred Jowett, of Sawley, for improvements in apparatus for heating; which improvements are particularly applicable for generating steam, or evaporating solutions, and may be applied for heating purposes generally.—April 6.

834. John Grist, of the New North-road, for improvements in machinery for the manufacture of casks, barrels, and other similar vessels.—April 7.

915. Jean Baptiste Maniquet, of Paris, for certain improvements in machinery or apparatus for winding, cleaning, doubling, twisting, and spinning silk, cotton, wool, flax, hemp, and other filamentous materials.—April 14.

935. William Fawcett and Francis Best Fawcett, of Kidderminster, for certain improvements in the manufacture of carpets.—April 18.

981. Henry Houldsworth, of Manchester, for improvements in machinery used for combing cotton, silk, silk waste, flax, tow, wool, and other fibrous substances.—April 23.

994. William Johnson, of Lincoln's-inn-fields, for improvements in the means of retarding and stopping railway trains,—being a communication.—April 25.

1030. Edward Bird, of Birmingham, for an improvement or improvements in the construction of certain kinds of vehicles.—April 28.

1054. John Balmforth, William Balmforth, and Thomas Balmforth, all of Clayton, Lancashire, for improvements in steam-hammers.—May 2.

1056. James Greenwood, of New Accrington, for an improvement in fixing mordants on fabrics.—May 2.

1058. John Filmore Kingston, of Carrol, Maryland, for improvements in reaping and mowing machinery.—May 2.

1059. Edwin Heywood, of Glusburn, near Keighley, for improvements in apparatus for actuating and regulating the throttle-valves of steam-engines.—May 2.

1080. Frederick Arnold, of Park-road, Barnsbury, for certain improvements in binding or covering books.—May 3.

1099. James Walker, of Bow, for improvements in turn-tables used for railway and other purposes.—May 4.

1119. George William Jacob, of Dalston, for an improved manufacture of metallic covers or seals for bottles, jars, and other like vessels, and in applying or affixing them.—May 6.

1131. Conrad William Finzel, of Bristol, for an improvement in refining sugar.—May 7.

1193. James Higgin, of Manchester, for improvements in printing or dyeing woven or textile fabrics, and in the manufacturing of certain substances to be used in the arts or processes of dyeing and printing.—May 14.

1211. Morton Hassall Phillips, of Shrewsbury, for an improved gun.—May 16.

1218. Samuel Eccles and James Eccles, of Kensington, Philadelphia, for certain improvements in power-looms for weaving figured fabrics.—May 17.

1223. Bernard Peard Walker, of Wolverhampton, and James Warren, of Mile-End-Road, for improvements in the manufacture of iron.—May 18.

1232. William Gossage, of Widnes, for improvements in the manufacture of alkali from common salt.—May 18.

1238. Thomas Grahame, of Hatton Hall, Wellingborough, for improvements in the manufacture of covering materials for houses and other structures and surfaces.—May 19.

1240. John Hippisley, of Stoneaston, for improvements in steam-engines, suitable for agricultural purposes, and to locomotion on common roads.—May 19.

1248. Edward Jones Schollick, of Aldingham Hall, Ulverstone, for improvements in obtaining motive power.—May 20.

1249. Samuel Schollick, of Ulverstone, for improvements in shipbuilding.—May 20.

1253. Edward Hammond Bentall, of Heybridge, for improved machinery or apparatus for measuring and indicating the power exerted by engines, and also the force required to propel machinery, carriages, or ploughs.—May 20.

1257. Joseph Betteley, of Liverpool, for improvements in anchors.—May 21.

1261. George Marriott, of Hull, for improvements in the manufacture of fire-lighters.—May 21.

1266. William Simson, of Edinburgh, for improvements in locks.—May 22.

1268. Amédée Devy, of Grosvenor-street, for improvements in storing and preserving grain,—a communication.—May 23.

1272. John Henry Johnson, of Lincoln's-inn-fields, for an improved forge hammer,—being a communication.—May 23.

1280. James Lovell, of Glasgow, for improvements in heating and ventilating.—May 25.

1283. Samuel Sanderson Hall, of the Minories, for improvements in the means of preventing railway carriages running off the rails,—being a communication.—May 25.

1285. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in the generation of steam,—being a communication.—May 25.

1286. Jonathan Dodgson Carr and John Carr, of Carlisle, for an improved construction of oven.—May 25.

1287. William Haslett Mitchell, of Brooklyn, New York, United States of America, for improvements in means for distributing and composing types.—May 25.

1294. William Warcup, of Bristol, for improvements in the construction of springs for carriages, and similar purposes.—May 26.

1295. Alphonse Rene le Mire de Normandy, of Judd-street, for improvements in regulating the pressure of steam.—May 26.

1297. Theophilus Westhorp, of Poplar, for improvements in the manufacture of oakum.—May 26.

1298. William James Harvey, of Exeter, for improvements in fire-arms.—May 26.

1302. Julius Augustus Roth, of Philadelphia, for improvements in the mode of, and machinery for, treating the fibres of flax, hemp, China grass, and other analogous substances, preparatory to spinning,—being partly a communication.—May 26.

1303. William Henham, of East Peckham, for certain improvements in ploughs.—May 27.

1306. Aristide Michel Servan, of Philpot-lane, London, for improvements in treating fatty matters to render them suitable for the manufacture of candles.—May 27.

1317. François Francillon, of Puteaux, France, for improvements in dyeing and printing silk, wool, and other animal fibres.—May 28.

1318. Daniel Bateman, of Low Moor, near Bradford, York, for improvements in carding wool and other fibrous substances, and in the manufacture of cards for that purpose.—May 28.

1321. Edward Duclos de Boussois, of Paris, for improvements in preventing incrustation of steam-boilers.—May 28.

1331. John Champney Bothams, of Vine Cottage, Camberwell-green, for improvements in condensing steam-engines.—May 30.

1334. William Brookes, of Chancery-lane, for improvements in stoves and grates or fire-places,—a communication.—May 31.

1338. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for an improved construction of hand-stamp,—being a communication.—May 31.

1339. Joseph Morris, of Astwood Bank, near Redditch, for an improvement or improvements in the manufacture of envelopes for needles.—June 1.

1346. James Stocks, jun., of Ovenden, for improvements in looms for weaving.—June 1.

1347. Admiral the Earl of Dundonald, of Belgrave-road, for improvements in apparatus for laying pipes in the earth, and in the juncture of such pipes.—June 1.

1360. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in the manufacture of soles for boots, shoes, and other coverings for the feet,—being a communication.—June 2.

1364. James Mayelston, of Elloughton, Yorkshire, for certain improvements in the manufacture and refining of sugar.—June 3.

1366. Isaiah Kendrick, foreman to Messrs. Horton and Son, of Southwark, for improvements in steam-boilers.—June 3.

1367. Thomas Barnabas Daft, of Lezange Lodge, Isle of Man, for improvements in inkstands.—June 3.

1376. John James Kerr, of Gloucester-grove West, Old Brompton, for improvements in the manufacture of cartridges.—June 4.

1379. Joseph Burch, of Crag Hall, near Macclesfield, for certain improvements in fans, blasts, or blowing apparatus,—June 4.

1380. William Dray, of Swan-lane, for an improved method of driving shafting.—June 4.

1391. Christopher Nickels, of Albany-road, Camberwell, and James Hobson, of Leicester, for improvements in weaving.—June 6.

1404. John Horrocks, jun., and James Dunlop Horrocks, of Down-street, Piccadilly, for improvements in the manufacture of detonating or percussion caps,—being a communication.—June 8.

1411. Joseph Smith, of Bradford, Yorkshire, for certain improvements in machinery for preparing and spinning wool, hair, silk, flax, and other fibrous substances.—June 9.

1412. Joseph Smith, of Bradford, Yorkshire, for certain improvements in combing wool and other fibrous substances.—June 9.

1416. James Robert Napier, of Glasgow, and William John Macquorn Rankine, of Rosebank House, Rutherglen, Lanark, for improvements in engines for developing mechanical power by the action of heat on air and other elastic fluids.—June 9.

1419. Josiah Moore, of Clerkenwell-close, for improvements in respirators.—June 10.

1421. Alfred Vincent Newton, of the Office for Patents, 66, Chancery-lane, for an improvement in spinning machinery,—being a communication.—June 10.

1422. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of paper,—being a communication.—June 10.

1423. Joseph Westwood and Robert Baillie, both of Poplar, for improvements in the construction of iron ships.—June 10.

1424. Christopher Nickels, of Albany-road, Surrey, and James Hobson, of Leicester, for improvements in the manufacture of carpets and other piled fabrics.—June 11.

1438. Robert William Sievier, of Upper Holloway, and James Crosby, of Manchester, for improvements in looms for weaving.—June 14.

1440. John Henry Johnson, of Lincoln's-inn-fields, for improvements in railway-brakes,—being a communication.—June 14.

1441. Thomas Richardson, of Newcastle-upon-Tyne, for improvements in the manufacture of certain salts of magnesia, and a red coloring matter.—June 14.

1442. Joseph Leon Talabot, of Chaussée d'Antin, Paris, and John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of iron.—June 14.

1443. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved mode of manufacturing cast-steel,—being a communication.—June 14.

1453. James Dilkes and Edward Turner, of Leicester, for improvements in door-springs.—June 15.

1455. William Gossage, of Widnes, for improvements in obtaining certain saline compounds from solutions containing such compounds.—June 15.

1458. William Baddeley, of Angel-terrace, Islington, for an improved label damper.—June 16.

1463. James William Gibson, of Long-acre, for a new method of pavement, tending to secure the evenness of the road and proper adhesion to the foot.—June 16.

1465. Joseph Ilsley, of Lisbon, for improved telegraphic apparatus.—June 16.

1469. Clinton Roosevelt, of New York, for an invention for reducing the friction of the journals of railway and other carriages; which is also applicable to the journals of machinery.—June 16.

1471. Benjamin Finch, of Dublin, for improvements in apparatus for supplying water to steam-boilers.—June 16.

1490. James Shanks, of St. Helen's, Lancashire, for improvements in the manufacture of alkali from common salt.—June 18.

1497. Samuel Schofield, of Oldham, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.—June 18.

1504. William Hodgson and Henry Hodgson, both of Bradford, Yorkshire, for improvements in machinery for spinning wool, hair, silk, flax, and other fibrous substances.—June 20.

1507. William Edward Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of handles for knives and other similar articles,—being a communication.—June 20.

CELESTIAL PHENOMENA for September, 1853.

D.	H.	M.	
1			Clock after the ☉ 0m. 11s.
—			☽ rises 2h. 13m. M.
—			☽ passes mer. 10h. 28m. M.
—			☽ sets 6h. 28m. A.
1	9	55	☿ in conj. with the ☽ diff. of dec. 5. 18. S
3	7	41	☿ in the ascending node.
	8	26	♃'s second sat. will em.
	11	42	Ecliptic conj. or ● new moon
	13	45	☿ greatest elong. 18. 2. W.
5			Clock after the ☉ 1m. 8s.
—			☽ rises 7h. 25m. M.
—			☽ pass mer. 1h. 41m. A.
—			☽ sets 7h. 48m. A.
7	21	23	☿ in Perihelion.
8	2	23	♃ in □ with the ☉
	7		☽ in Perigee
9	18	22	♃ in conj. with the ☽ diff. of dec. 0. 23. N.
10			Clock after the ☉ 3m. 10s.
—			☽ rises 2h. 18m. A.
—			☽ pass mer. 6h. 10m. A.
—			☽ sets 9h. 58m. A.
	8	58	☽ in □ or first quarter.
13	14	8	♄ stationary.
14			Occul. B.A.C., 7550, im. 7h. 2m. em. 8h. 11m.
	6	35	♃'s first sat. will em.
15			Clock after the ☉ 4m. 55s.
—			☽ rises 6h. 8m. A.
—			☽ pass mer. 10h. 53m. A.
—			☽ sets 2h. 33m. M.
	21	22	♀ in the descending node.
17	10	12	Ecliptic oppo. or ○ full moon
18			Occul. 33 Ceti, im. 13h. 21m. em. 13h. 49m.
	5	28	☿ greatest hel. lat. N.
	—		Mercury, R. A., 11h. 10m. dec. 7. 18. N.
	—		Venus, R. A., 13h. 47m. dec. 11. 12. S.
18			Mars, R. A., 7h. 59m. dec. 21. 35. N.
	—		Vesta, R. A., 8h. 56m. dec. 18. 31. N.
	—		Juno, R. A., 9h. 37m. dec. 7. 30. N.
	—		Pallas, R. A., 15h. 15m. dec. 10h. 31. N.
	—		Ceres, R. A., 15h. 18m. dec. 15. 49. S.
	—		Jupiter, R. A., 17h. 2m. dec. 22. 33. S.
	—		Saturn, R. A., 4h. 0m. dec. 18. 23. N.
	—		Uranus, R. A., 2h. 39m. dec. 15. 5. N.
	—		Mercury pass mer. 23h. 24m.
	—		Venus pass mer. 1h. 58m.
	—		Mars pass mer. 20h. 8m.
	—		Jupiter pass mer. 5h. 12m.
	—		Saturn pass mer. 16h. 8m.
	—		Uranus pass mer. 14h. 47m.
20			Clock after the ☉ 6m. 40s.
	—		☽ rises 7h. 30m. A.
	—		☽ pass mer. 1h. 55m. M.
	—		☽ sets 8h. 49m. M.
20	15	49	♅ in conj. with the ☽ diff. of dec. 2. 21. N.
21	8	30	♃'s first sat. will em.
22	9	5	♄ in conj. with the ☽ diff. of dec. 1. 13. S.
	15	36	☉ enters Libra, Autumn com.
23	9	0	☽ in Apogee
25			Clock after the ☉ 8m. 25s.
	—		☽ rises 9h. 53m. A.
	—		☽ passes mer. 5h. 44m. M.
	—		☽ sets 2h. 23m. A.
	10	43	☽ in □ or last quarter
27	10	21	♂ in conj. with the ☽ diff. of dec. 2. 51. S.
29	10	33	☿ in sup. conj. with the ☉

J. LEWTHWAITE, Rotherhithe.

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RECENT PATENTS.

To JOHN ROBERTS, *of Upnor, in the county of Kent, potter, for improvements in apparatus for preserving animal and vegetable matters, and for cooling wines and other liquids.* [Sealed 22nd December, 1852.]

THE object of this invention is to retain liquid and solid edible substances at a low equable temperature, and, at the same time, to preserve such substances from the attacks of flies and other insects. In carrying out this invention the patentee constructs, for the reception of the viands or other matters, a chamber, in which a circulation of air is kept up, by permitting free access of air to the interior thereof, through perforations made in the sides or bottom of the parts constituting the chamber. This chamber is constructed either wholly or in part of some absorbent material, which will take up or absorb water by capillary attraction or suction, and will, by the action of the ascending currents of air in the chamber, and also by that of the surrounding atmosphere, give off the water so absorbed in the form of vapour; and thus continuously absorb water and yield it up as vapour so long as any water is contained in a supply vessel, with which the chamber is provided.

In Plate VIII., fig. 1, shews, in sectional elevation, a small cooler, constructed according to this invention, and intended for domestic purposes. It consists of a circular earthenware dish *a*, provided with a flange, in the upper face of which a half-round annular groove *b*, is formed. In this groove a dome-shaped cover *c*, is set, and water is poured in the groove, when the cooler is in use, to make a water-tight joint, and

prevent the passage of insects between the joint to the interior. Through the sides, and through the flange of the dish *a*, minute perforations are made for the admission of air; and the cover *c*, is perforated in like manner, to assist in maintaining a perfect ventilation in the chamber. *d*, is a pierced tray, which rests on a ledge on the dish, and is intended to carry the matters that are put into the cooler. In this arrangement the several parts are composed of porous clay. The cover *c*, is made hollow at its upper part, to receive a supply of water, which, owing to the porous nature of the material containing it, will be absorbed or taken up by the clay, as evaporation from the exterior surface of the cover proceeds; and in proportion to this evaporation so will be the abstraction of heat from the chamber.

When larger sizes of coolers are required, for domestic use, the patentee embodies the principle of his invention in the form shewn in sectional elevation at fig. 2. In this instance, instead of constructing the cover *c*, of clay, which would render it very inconvenient to remove and replace, it is formed of perforated zinc; and in the upper part a well *e*, (which must be of solid metal) is sunk, for the reception of water. Over this metal cover a canvas casing is placed, and its upper part is immersed in the water contained in the well *e*. By this means the required evaporating surface is obtained, which will absorb the water by capillary attraction, in proportion as it yields it up in the state of vapour, produced by the combined action of the streams of air passing through the cover and the surrounding atmosphere.

Fig. 3, represents, in longitudinal vertical section, and fig. 4, in cross section, an arrangement of stationary coolers, suitable for the preservation of meat in large quantities. In this instance, in constructing the chamber, a frame of angle-iron *f*, *f*, is used, and the panels are filled in with wire netting or perforated zinc *g*, *g*. The roof is composed of plates of zinc, set at an angle to form a trough or cistern *h*, for holding water, and the ends are closed with vertical plates. This chamber is covered with canvas, both at its top, sides, and ends, so that the canvas may, by capillary attraction, gradually exhaust the water from the trough or cistern, and remain, so long as the cistern contains water, in a state of saturation. The framing *f*, is set up in a gutter *i*, which is made in the floor of the chamber, and is intended to receive water to form a water-tight joint, and also to supply water to the evaporating surfaces when the trough *h*, is empty. The floor is pierced with holes for the admission of streams of air, which circulate

in and pass through the sides of the chamber. Access is gained to this chamber by means of a door *k*.

The patentee claims constructing chambers—in which a free circulation of air is kept up, while the entrance of flies or other like insects is prevented—with surfaces capable of absorbing water, by suction, from an adjoining vessel or reservoir, and of giving off the water in the form of vapour, when such evaporation is assisted by streams of air passing from the interior to the exterior of such chambers.

To JOSEPH MAJOR, *of Elizabeth-place, Balls Pond Road, for removing spavins, ring-bones, curbs, splents, and other unnatural ossifications and humours from horses.*—[Sealed 14th October, 1852.]

THIS invention consists in combining the ingredients mentioned below, and, by preference, in the following proportions:—14 parts, by weight, of Seneca oil, which is an oil well known and sold by chemists in America; 4 parts, by weight, of Barbadoes tar; 5 parts, by weight, of oil of rosemary; 3 parts of oil of lavender; 6 parts of spirits of turpentine; and 3 parts of Venice turpentine. These matters or ingredients are to be intimately mixed together and placed in an earthenware vessel, and then 16 parts, by weight, of sulphuric acid are to be stirred in gradually; and when the effervescence has subsided, the preparation is complete. In applying this remedy, the hair is to be cut from the part affected, and care must be taken to keep the part dry during, at least, ten days, as wet injures the effect of the medicine: the animal should also be kept at rest for two or three weeks.

The patentee claims the combination herein described.

To WILLIAM STEVENSON, *of Preston, Lancashire, for improvements in weft-forks for power-looms.*—[Sealed 15th October, 1852.]

THE patentee commences his specification by stating, that the ordinary weft-fork, as commonly used for stopping the action of power-looms when the weft-thread breaks, is subject to be broken by the shuttle accidentally catching against it. Now this invention consists in so forming weft-forks, that when there is any danger of the fork breaking, that portion which is most liable to be fractured may give way.

This is effected by hinging or jointing the vertical portion of the fork (or that part whereon the weft-thread acts) to the body thereof; when, therefore, the shuttle is stopped in its passage across the loom, the jointed part of the fork will be capable of rising upon its hinge, and thus it will be prevented from breaking. When the pressure is released, the hinged piece will again fall down to its proper working position; and as its joint is made with a stop-piece it will be prevented from moving in an opposite direction: the action of the forks, therefore, in connection with the working on the weft, remains unimpaired.

In Plate VIII., fig. 1, is a side elevation of the improved weft-fork or protector, shewing the back-stop or detent-lever which actuates the stop-rod of the loom whenever the weft breaks; and fig. 2, is a plan view of the same. The fixed stud *a*, of the fork is cast, or otherwise formed, with a wide double eye *b*, for the reception of the flat expanded end of the detent-lever *c*, which is retained in its position by a joint-pin passing through the lugs *b*, *b*, of the double eye and through the lever,—the expanded portion of which affords space for receiving the hinged prongs *d*, *d*, which are, as usual, three in number, and are loosely held therein by the joint-pin already referred to. The bottom of each of the recesses or slots in the lever *c*, is angularly sloped, whilst the inserted end of each of the prongs is correspondingly angled or inclined to fit it. It will therefore be obvious, that so long as the fork works without meeting with any obstruction, the prongs will hold the position shewn at figs. 1, and 2; and the passing weft-thread will act upon the vertical portion of the prongs, so as to raise the catch *e*, of the detent-lever clear of the stop-movement at each passage of the weft, in the same manner as the ordinary fork,—because the incline upon the prongs acts upon the inclined bottom of its recess exactly in the same way as if the fork were a solid one; but if an intercepted shuttle chances to be in the way, it will simply act upon the inside edges of the prongs *d*, *d*, and raise them to the position shewn by dotted lines in fig. 1,—thereby preventing the fracture which would be inevitable with the common solid fork. Then, so soon as the obstacle is removed, the prongs fall to their accustomed position, and their regular action goes on. A similar effect is also obtained by constructing the prong portion of the fork of some elastic material which yields when struck against by the shuttle, but is stiff or rigid enough for the weft action.

The patentee claims, First,—the systems or modes of con-

structing and arranging the weft-forks or protectors of power-looms, for the prevention of fracture and derangement. And, Secondly,—the application and use of weft-forks or protectors, with hinged or jointed prongs, for the purpose hereinbefore described.

To Joseph Burch, *of Crag Hall, near Macclesfield, in the county of Chester, carpet manufacturer, for certain improvements in baths and bathing.*—[Sealed 15th October, 1852.]

This invention consists, first, in the use of cisterns and service-pipes, having flexible tubes, and bathing apparatus attached thereto; secondly, in conveying water from cisterns or service-pipes, through moveable brushes, friction-gloves, belts, sponges, and towels, by means of flexible water-tubes, for the purposes of bathing, scrubbing, rubbing, cleansing, and washing the human body; and, thirdly, in the construction and use of portable expanding chamber-baths.

The object of this invention is to apply moisture and friction at the same time; and also to afford the comfort of an invigorating friction-bath, where the supply of water is too small for the ordinary mode of bathing. In houses where baths are required in several bed-rooms, they are fitted up and used in the following manner:—The hot and cold water-cisterns being fixed in the upper part of the house, so as to be above the level of the bather, are made to communicate with the different bed-rooms by means of a service-pipe *c*, shewn at Plate VIII., fig. 1. Connected with this pipe are union branches *d*, and the supply of water thereto is regulated by a stop-cock *e*. Each union branch-pipe has several small flexible branch-tubes *g*, *g*, *g*, which are provided with cocks *f*, *f*, *f*; and attached to the loose extremities of these flexible tubes are the bathing, friction, and scrubbing apparatus. The articles used for this purpose will be brushes *h*, one of which is shewn, in section, at fig. 2; gloves *i*, fig. 3; belts *j*, fig. 4; and sponge *k*, fig. 5; which are to be so constructed and fixed to the flexible tubes, that the water will pass through them, and escape in small quantities through those parts only which come in contact with the bather, or to the articles to be cleansed. The brush is made hollow and filled with water from the flexible tube, and, being perforated with small holes among the bristles, the water will escape through such holes in small quantities. The glove is made

double, and of a waterproof material in the palm thereof: the case or bag, thus formed, is filled with water by means of the flexible tube; and, being perforated about the palm, will permit the water to escape at that part. The belt is constructed in a similar manner. When either of these articles is applied to the body, the impurities on the surface of the skin will be removed by the combined action of friction and rinsing,—a continuous supply of warm or cold water flowing through the friction surfaces during the operation; and thus, by combining the processes of rubbing and washing, a comforting and refreshing bath will be produced; which, by its frequent use, will tend to strengthen and invigorate the system.

This bath, besides being applied to the human body, may be used for washing and cleansing horses and other animals, and likewise for many manufacturing purposes. In large towns, where the supply of water is limited, it will be found of great service as a bath; and in ships, where the supply is still more scarce, a quart of water, economically used, will be found to yield a comfortable and refreshing bath to every part of the body.

It is preferred that the flexible tubes should be made of vulcanized India-rubber,—that material being very soft and yielding; and that a preparation of the same substance should be used for the gloves, belts, &c.

Fig. 6, is a front elevation of the portable expanding chamber-bath, shewing the internal arrangements; and fig. 7, is a sectional plan view of the same. This bath may be used either as a bath, when raised up to its full height, or a table when down. It is fitted, at top, with a hot and cold water-cistern *a*, and *b*; and the pedestal legs are fitted on the telescope slide principle. When required to be used as a bath, the upper part is raised by means of the handle *l*, which, being turned, sets the bevil-wheels *m*, and radial shafts *n*, in motion; and these, by means of external bevil-wheels *o*, communicate motion to slide-screws *p*, inside the pedestal legs; by which means the top of the bath is raised to its proper height; and, by reversing the motion of the handle, it can again be reduced; when it may be used as a table.

The patentee claims, First,—the mode of constructing bathing and cleansing apparatus upon the principle, style, or manner, and for such like purposes, as are herein described. Secondly,—the mode of using bathing and cleansing apparatus, consisting of hollow moveable perforated friction brushes, belts, gloves, and rubbers, in connection with flexible tubes,

stop-cocks or valves, service-pipes, and water-cisterns; and also for supplying sponges, towels, and other cleansers, with moisture, by the same means and for such like purposes as are herein described. And, Thirdly,—the mode of constructing portable expanding baths, upon the principle and manner, and for such like purposes, as are herein described.

To RICHARD ARCHIBALD BROOMAN, *of Fleet-street, for improvements in vices.*—[Sealed 18th October, 1852.]

THIS invention consists in constructing vices in such a manner that one of the jaws shall exert an equable pressure or holding power throughout its length, upon a wedge-shaped or other irregularly-formed article, when placed betwen the said jaw and the other jaw of the vice,—the latter being of the usual construction. In the usual method of constructing vices the gripping surfaces of the jaws are parallel; and by this arrangement, although an article of a regular form, possessing parallel sides, is securely held, an irregular or wedge-shaped object does not receive an equal pressure on its sides, and therefore cannot be firmly clamped in the vice. Now, the object of the present invention is to obviate this difficulty, which is overcome by making the vice with an oscillatory jaw, which may be varied in form to suit particular circumstances.

In Plate IX., fig. 1, represents a perspective view of the improved vice. *a*, is the back or stationary jaw of the vice, to which is secured a clamp *b*, by means of a screw *c*. *a**, is an additional jaw, which is connected with the clamp *b*, by means of a pivot or step *d*, upon which it has a vibratory motion. The back of the jaw *a**, is enlarged at the centre, so as to bear against the face of the back or stationary jaw *a*, at a single point only; and thus it is capable of shifting, so as to adjust itself to hold an article of an irregular or wedge-shape, as shewn in plan at fig. 2; whereby the act of closing the jaws adapts the compound back jaw to the form of the object embraced. It is not essentially necessary that the additional jaw *a**, should be attached to the clamp *b*, as it may be continued downwards, and be supported by clasping the screw-case *f*; which would admit of its being more readily removed when it is desired to be used as a vice of the ordinary construction.

A modification of the above is shewn, in perspective, at fig. 3; in which the usual back or stationary jaw, instead of

being constructed in the ordinary manner, is replaced by a vibratory jaw *e*, which works in a vertical pivot, fitted into a socket in the solid metal of the vice above the screw-case. The jaw is capable of turning on this pivot as a centre; and, by this means, adjusting itself so as to embrace an irregular-shaped article firmly, when the moving jaw is brought up to it.

The patentee claims the construction of vices with an oscillatory jaw, so as to adapt the same to the holding of articles of irregular form.

To JOHN GOODMAN, *of Hazel-grove, in the county of Chester, Doctor of Medicine, for an improved fountain pen.*—[Sealed 19th October, 1852.]

THIS invention relates to an improved portable fountain pen or pen-holder, which may be conveniently carried in the pocket, and is capable of containing a plentiful supply of ink; the flow of which can readily be increased, or diminished, or stopped instantaneously, when required. The body of this pen is formed of a hollow metallic cylinder, perfectly true or parallel throughout its entire length. A piston, suitably packed, and capable of moving from end to end, is fitted into this cylinder, and a central screw also extends the entire length of the same, passing through a tapped orifice in the centre of the piston. The upper end of the screw is secured to a thimble or ferrule, which revolves in or upon the upper end of the cylinder, and keeps that end of the screw always central. The lower end of the screw is firmly screwed into a revolving tube, which is suitably packed, and passes out through the lower end of the cylinder. In order to compel the screw to turn with the tube, and to maintain the screw and tube in their respective places, the lower end of the screw and the upper end of the tube are squared or flattened, and a small cap, uniting the two, is fitted thereon, and secured by a nut. The revolving tube is furnished, at or near its centre, with a boss; the periphery of which is milled, in order to facilitate its being turned by hand. The lower end of the tube, which is chased with a left-handed screw, is also suitably packed, and screwed into a small cylinder, at the lower end of which is an orifice, leading to a small bent tube, which supplies the pen with ink. The lower end of the revolving tube is formed solid; the orifice for the ink being at the sides, and nearly touching the bottom of the small cylinder; so that, when the cylinder is screwed up or down in the slightest degree, by means of the

milled boss, the end of the tube closes or opens the orifice of the small bent tube that supplies the pen with ink.

In Plate IX., is a section of the improved pen. *a, a,* is the cylinder or reservoir for containing the ink; *b, b,* is the piston, which is packed both inside and outside, and through a tapped orifice in the centre of which the screw *c,* passes. The upper end of the screw is attached to a thimble or ferrule *d, d,* which is fitted into the upper end of the cylinder *a, a,* and thus keeps that end of the screw central. The lower end of the screw is squared and screwed into the revolving tube *e, e.* The small cap *f, f,* unites the squared end of the screw and the squared end of the tube, and thus compels them to turn together, and is secured by the nut *g.* It will be seen that there are diagonal holes or openings drilled in a lateral direction through the cap and tube, forming a communication for the flow of ink from the cylinder to the interior of the tube. *h, h,* is the milled boss, by means of which the tube *e, e,* may be turned. *i, i,* is a small cylinder, which is attached by means of a left-handed screw to the lower end of the tube *e, e,* and is also furnished with a milled boss, for the convenience of turning. The lower end of the cylinder *i, i,* is provided with a small bent tube *k, k,* for supplying ink to the pen, and also with either a fixed metallic pen or socket for holding metallic or quill nibs. The cap or ferrule *l, l,* at the upper end of the pen-holder, is provided with a seal or stamp, which is to be withdrawn and placed upon the other end of the pen when not in use, or carried in the pocket. The method of using the pen is as follows:—In order to supply the cylinder with ink, the caps or ferrules *l, l,* and *d, d,* are first removed, and, by means of the milled boss *h,* the piston is screwed on to the upper extremity of the screw, and the cylinder is then filled with ink. The patentee remarks, that, owing to the greater amount of friction upon the outside of the piston than upon the inside, the piston will have no tendency to turn with the screw, and therefore no groove or other contrivance to prevent its revolving is necessary. The pen being now charged with ink, is ready for use, and as the supply becomes deficient, the screw *c,* must be turned to the right, which will bring down the piston and feed the pen with a fresh supply; but when it is required to stop the flow of ink altogether, the small cylinder *i, i,* must be turned to the left; whereby the orifice of the small bent tube *k, k,* will be closed. The cylinder *i, i,* is connected to the tube *e, e,* by a pin and slot, in such a manner as only to allow of its turning upon the tube *e, e,* to the right, a sufficient distance to open the

orifice of the bent tube; so that, upon still turning it in the same direction, it will turn the screw, move the piston forward, and bring down a fresh supply of ink.

The patentee claims the general construction and arrangement of the several parts, as above described and shewn in the figure; more especially the revolving screw, working through the tapped orifice in the centre of the piston, for regulating the supply of ink or other fluid.

To JULIANA MARTIN, *of Soho-square, for an improved apparatus for artificial hatching.*—[Sealed 22nd October, 1852.]

THIS invention consists of an improved apparatus for artificial hatching which is more portable, cleanly, and economical than most of those hitherto in use.

In Plate VIII., fig. 1, is an elevation of the apparatus, supported by an iron frame *a, a*; and *b, b*, are hollow partitions, dividing the central portion of the machine into compartments *c, d, e*. Semi-cylindrical vessels *f, f*, are placed in communication with the partitions *b, b*, for the purpose of supplying them with water. *g, h*, are trays, for holding the eggs to be hatched, one of which is shewn, in plan, at fig. 2. *i, i*, are taps, for allowing the vapour to escape from the top of the vessels *f, f*; and a tap may also be fitted to the lower part of the same, to draw off and change the water when necessary. The whole of the apparatus is made of zinc or galvanized iron; and to prevent as much as possible the radiation of heat, the sides of the vessel *f, f*, are covered with woollen cloth or other suitable non-conductor. Curtains are fitted to cover the compartments *c, d, e*, shewn at *f**, and these are again covered by outer curtains, suspended from eyes *k, k*. The proper degree of heat is maintained by means of lamps *l, l*, which are supported beneath the vessels *f, f*, by lugs *m, m*, fitting into the hasps *n, n*. The outer casing of the lamp is made of perforated metal, and has a plate of talc *o*, fitted therein, to enable the person in charge to see whether the lamps are in proper order. To permit of the adjustment of the height of the lamps, screws *p, p*, are provided, which slide up and down in slots *q, q*, and carry with them the trays *r, r*, for holding the lamps.

The mode of working the apparatus is as follows:—One of the taps *i*, is to be unscrewed, and two vessels *f, f*, which communicate with the partitions *b, b*, are to be filled with

water, at a temperature of 120° Fahr., as shewn in section at *s*, for imparting heat to the trays in the compartments. The lamps are then to be lighted and adjusted in their places,—the number of wicks being varied according to the state of the weather. When cold, six will be required; but in other cases, four, or even two, will be sufficient. A thermometer is to be affixed in the side of one of the vessels, in order to ascertain the temperature of the water. The bottom of the trays *g*, and *h*, are made of perforated metal, and to the upper part of each, is fastened a flannel bag *j*. (see fig. 2.) A quantity of hay being put into the trays, the eggs are then to be laid therein; and the trays are placed in the compartments *c*, *d*, *e*, and kept in contact with the partitions above, by means of slips of wood *t*, as shewn in the lower compartment *e*, fig. 1. The trays are to be removed every six hours, for five or ten minutes, for the purpose of airing the eggs; they should then be gently turned with the hand. It is important that the temperature of the water should always be maintained at 110° to 115° Fahr. A plate of perforated metal is sometimes placed on the eggs, in order to steady them when the chickens are chipping their way out. When the chickens are hatched, they are removed to a wire cage *u*, which is fitted with a sliding door and suspended below the machine. This cage is lined with fur, and heated by the partition *b*, above, so as to imitate as closely as possible the natural warmth imparted by the hen. *x*, *x*, are metal guards, to shield the cage *u*, from any excess of heat which may be imparted from the lamps *l*, *l*.

The upper part of the machine *w*, is intended for finishing the hatching of the eggs, and it is also useful for restoring chickens when numbed with cold, as is frequently the case: it is lined with flannel, and furnished with an air tube for carrying off the warm air.

Fig. 3, is an apparatus for sheltering and imparting warmth to a number of chickens, and is shewn partly in section. The vessel A, contains water, which circulates round the chamber B, by means of a pipe connecting the two together: beneath this chamber—the under surfaces of which are lined with fur C, in a manner similar to the cage *u*, fig. 1,—the chickens take shelter. D, D, are ventilating tubes, communicating with the upper part of the space E, to carry off any impure air. The chamber B, beyond the vessel A, is intended to be enclosed within a coop, so that the chickens cannot be injured by the heat of the lamp F, which heats the vessel A, and is similar to those shewn in fig. 1. This coop may be either portable or not,

and may vary in size, according to the number of chickens required to be hatched.

The patentee claims the apparatus for artificial hatching, herein shewn and described.

To William White, *of Cheapside, hat manufacturer, for an improved fabric suitable for ventilating hat bodies.*—[Sealed 23rd October, 1852.]

This invention relates to the production of a fabric, suitable for ventilating hat bodies, composed entirely of Manilla grass, the interstices of which will not become choked or filled up when stiffening such hat bodies. This fabric is produced by weaving the Manilla grass in an ordinary loom,—both warp and weft being composed of such grass. Care should be taken to weave the fabric so open as to leave large interstices between the threads. When the bodies of hats are thus formed of this material, the workman should be careful, in stiffening the same, not to fill up the interstices or spaces between the threads; and thus a flexible and ventilating hat body will be produced.

The patentee claims the improved fabric for hat bodies, as hereinbefore described.

To Alfred Auguste de Reginald Hely, *of Cannon-row, Westminster, civil engineer, for an improved shade or chimney for lamps, chandeliers, gas, and other burners.*—[Sealed 3rd November, 1852.]

This invention consists in producing upon the inner or outer surface of a transparent or translucent glass shade or chimney for lamps, chandeliers, gas and other burners, one or more patches, or bands and patches, of colors; which patches or bands may be etched, cut, embossed, engraved, or prepared, so as to exhibit any desired lettering, figures or devices, in a permanent manner. The patentee remarks that, to avoid confusion, by the term "glass" he means glass usually so called, and all other vitreous compounds transparent or translucent: by the term "shade or chimney," he means globes, moons, lotuses, bells, domes, vases, dishes, consumers, chimnies, and all other varieties of the article that are used for the purposes aforesaid. By the term "patches," he means all figures, large or small, bounded by straight or

curved lines. By "bands," he means stripes, garters, fillets, and all similar straight or curved lines. The patches or bands depicted upon any shade or chimney, taken wholly, partially, or mingled, as depicted upon any other patches or bands of colors, may be produced by the following processes, which are considered to be the most economical, permanent, and effective, namely, casing and staining. By the former—if the shade be blown open on the surface of the clear glass whilst in a heated state—a sufficient layer of hot colored glass is deposited: it is blown, spread, pressed, or fused, until the two glasses have amalgamated or become fixed one to the other: but if the shade be moulded, a sufficient layer of colored glass is first inserted, and then the clear glass is blown out to it, so as to form the shade with the layer firmly united thereto. By the second process a sufficient mineral or metallic coloring matter, prepared according to the usual recipes for glass staining or enamelling, is deposited in the ordinary way upon the inner or outer surface of the shade, after it is blown or moulded; and it is then submitted to the action of heat, in the usual way of "burning in" or fixing the coloring matter deposited. After the colors, cased or stained on, have been produced (should they not possess the requisite forms and sizes), all superfluous color is "cut out" with the usual tools, or "cut away" with the usual acids; and the requisite letters, figures, or devices, are cut out or cut away, in like manner, from the colored stratum or strata, so as to ensure either a colored effect upon a clear ground or a clear effect upon a colored ground.

The patentee claims the production of a glass shade or chimney for lamps, chandeliers, gas, and other burners, such as hereinbefore set forth and described, whether by the processes hereinbefore directed, or by any mere equivalent for the same.

To ROBERT WILLIAM MITCHESON, *of Garford-street, anchor-smith, for improvements in anchors.*—[Sealed 25th October, 1852.]

THIS invention consists in so forming the palms of anchors that they shall not become liable to be clogged or choked; also that the extremity of the palms shall be constructed so as more readily to take the ground.

In Plate VIII., fig. 1, is a front elevation of the improved anchor; fig. 2, is a side view; fig. 3, is a plan view of the palm; and figs. 4, 5, and 6, are sections of different parts of

the anchor. In order to prevent the palms *a, a,* from clogging or being filled with mud, &c., their faces are made convex, as shewn, in plan view, at fig. 3; and, in section, at fig. 4. And to the extremity of the palms of the anchor, an inclination is made in the reverse direction to the curve of the arms, as shewn at *b, b,* figs. 2, and 3, to enable the anchor more readily to lay hold of the ground.

The patentee claims, First,—the making of the palms of anchors convex; and, Secondly,—the inclining of the extremity of the palms of anchors in a reverse direction to the curve of the arms, as hereinbefore described.

To CHARLES GRIFFIN, *of Leamington Spa, Gent., for improvements in apparatus for fixing type or printing surfaces in a chase.*—[Sealed 9th November, 1852.]

THIS invention relates to fixing type in a chase, and consists of an apparatus which has corresponding inclined surfaces,—parts of such inclines being moveable by means of screws; so that the apparatus will be wider or narrower according as the screws are moved in one or other direction.

In Plate IX. is a plan of an apparatus, constructed according to this invention; in which *a, a,* is a double incline, and *b, b,* are two inclines, which are capable of being moved either towards or away from each other, as desired, by means of screws *c,* which screw into the two moveable inclines *b, b*; such screws being moved by a spanner *c**. The moveable inclines *b, b,* are made with slots, and are connected to the inclines *a,* by screws *d, d*; hence, although the parts *b, b,* are capable of moving along the inclines *a, a,* they are prevented from separating therefrom. The parts *a,* and *b,* are shewn in their most contracted or their narrowest position; and the width occupied by the parts *a,* and *b,* will be greater and greater according as the inclines *b, b,* are moved towards each other by the screws *c*; and, by being so expanded, they will tighten up the type in the chase.

The patentee remarks that, although he believes the arrangement shewn to be the most convenient and best for carrying out this invention, he does not confine himself thereto, as variations may be made therein, so long as inclines are arranged in combination with screws, and capable of being moved thereby, in place of being set up by driving, as heretofore. He claims combining inclines with screws for fixing type or printing surfaces in a chase.

To Sir Charles Fox, Kt., *of New-street, Spring-gardens, for improvements in roads,—being a communication.*—[Sealed 12th November, 1852.]

This invention relates to constructing roads by means of fragments of stone, in combination with puzzolana and bituminous and resinous substances. In order to carry out this invention (which is particularly applicable to repairing macadamized roads) the road is to be first made in the ordinary manner of making a macadamized road; and when the stones have become settled, the invention may be applied to it in the same manner as in repairing an old macadamized road. For this purpose the surface of the road is to be swept or otherwise cleaned, to remove the mud and dust, and expose an irregular or rough surface of broken stones, for the reception of the following composition:—Eight parts, by weight, of resin, are melted, together with eight parts of vegetable or mineral tar, or other similar bituminous matter, in a pan or cauldron; and thirty-three parts of dry finely-powdered natural or artificial puzzolana are added, and the whole is well stirred and incorporated together: sixty-nine parts of broken granite or other hard stone, such as is used for ordinary macadamized roads, are then added, and well mixed with the other ingredients. The broken stone may be used cold, or it may be heated, to prevent it from chilling the composition when thrown therein. This hot mixture is spread over the cleaned dry surface of the road, to a thickness of from 1½ to 2 inches or more, and it is then beaten with hot iron bars, to consolidate it, and to leave a surface sufficiently to give a foot-hold to the horses passing over it. When the composition has cooled and hardened, the operation is complete, and the road is fit for use. The operation should not, however, be performed in frosty weather. If, after spreading the composition, it should appear to be not sufficiently hard, it may be rendered so by spreading over and beating into it one or more layers of gravel before it has completely set. The cohesion of the composition is caused by the combination of the puzzolana with the tar and resin; whereby the whole is cemented together, and cannot therefore be destroyed, either by excess of dryness or moisture, or by frost,—as is the case with the ordinary macadamized road. Its cohesion is said to be such, that the angles of the broken stones may be allowed to project, so as to render the surface rough, with little or no danger of the fragments being detached by the traffic upon the road; and in this manner the slippery surface of an ordinary asphalte road is avoided.

The patentee claims constructing roads of a composition or mixture of bituminous and resinous substances, with puzzolana and broken stones, as hereinbefore described.

To William Baddeley, *of Islington, engineer, for improvements in apparatus for the conversion of rectilinear into circular motion,—being a communication.*—[Sealed 8th December, 1852.]

This invention consists in employing two cranks, one of which has a fixed and determinate, and the other a variable radius. The first-mentioned crank is placed intermediately, at any given point, upon the connecting-rod between the rectilinear motive power and the second crank or main shaft of the engine. The second crank has a slot or other contrivance for enabling the end of the connecting-rod to move to and fro freely; so that, while the first or common crank moves round in a circular orbit, the outer end of the connecting-rod is compelled to move in an elliptical orbit; thereby increasing its leverage on the main crank, at those points which are most favorable for the transmission of motion.

In Plate IX., fig. 1, represents the connecting-rod *a, a*, of a horizontal cylinder steam-engine: the length of stroke (say 18 inches) is shewn at A, B. *b, b*, is a 9-inch crank, placed halfway between the extremities of the connecting-rod. Upon the main shaft *c*, there is an 18-inch slotted crank *d*, in which a guide-pin and block *e*, attached to the main-shaft end of the connecting-rod *a, a*, traverses. By this arrangement the centre of the connecting-rod moves round in a circular orbit, shewn by dotted lines *f, g, h*, while the main-shaft end of the connecting-rod moves round in the elliptical orbit shewn by dots *i, k, l*, instead of a circle, which it would have described if attached to a 9-inch crank in the usual manner.

Fig. 2, is a modification of the above, in which the connecting-rod *a, a*, is attached to an 18-inch crank *m*, upon the main shaft *c*, by means of a link *n*, which travels round the main shaft *c*, while the main-shaft end of the connecting-rod describes the same elliptical orbit *i, k, l*, as in the previously-described arrangement; thereby enabling the motive power to act in a more favorable position, and through a longer space; by which means a considerable advantage is obtained.

In both these arrangements the intermediate crank is shewn as attached midway between the extremities of the connect-

ing-rod; and, in many cases, this will be found to be very advantageous: it may, however, be placed at any convenient intermediate point between the power and the main shaft. The greater the distance between the intermediate and the main cranks, the greater will be the range of motion and the effective length of the crank, and *vice versâ.*

The patentee claims the conversion of rectilinear into circular motion, by the employment of two cranks; by the first of which the movement of the connecting-rod is controlled and guided, and its further end is compelled to move in an elliptical orbit; thereby increasing its leverage upon the main crank at those points most favorable for the transmission of power.

To JAMES LAMB, *of Kingsland, Gent., and* JOSEPH MENDAY, *of the same place, engineer, for improvements in the construction of kilns for burning or calcining cement, chalk, limestone, and other substances requiring such process, and in the application of the heat arising therefrom to the generation of steam.*—[Sealed 23rd October, 1852.]

IT is well known that in the calcination of cement, stone, chalk, lime, and other similar substances in kilns, very great heat is required, and in consequence of the immense mass of fire that exists in the interior of the kiln, the sides or walls of the kiln become highly heated. A great portion of this heat usually escapes by radiation externally from the sides of the kiln, and therefore becomes wasted. The principal object of the present invention is to absorb and utilize this heat, and prevent it from being wasted. This is effected by adapting to that part of the kiln where the greatest heat always exists, an annular water chamber or water wall, which is built into the brickwork. By supplying this chamber with water in any convenient manner, a large quantity of steam will be generated by the heat of the kiln, and may be applied to work an engine, or used for any other purposes for which it may be required. This water chamber or boiler, which may be constructed either of copper or iron, is surrounded by a flue in which the caloric from the heated mass of materials in the centre may circulate; or, if required, heat from an additional furnace may be conducted into this flue for the purpose of maintaining the steam at a uniform temperature. The rapid generation of steam may be considerably assisted by constructing tubular flues, which pass from the interior

through the water chamber to the flue which surrounds the latter. Or, in place of tubular flues, a series of water pipes may be extended across the kiln from one side of the annular water chamber to the other. Instead of carrying these horizontal pipes from side to side of the kiln, they may meet in a large vertical pipe or boiler, set in the centre of the kiln, which central boiler may have branch connections with the top or steam space of the annular water chamber.

In Plate IX., fig. 1, is a plan or top view of an ordinary cement kiln, with the improvements adapted thereto. Fig. 2, is a vertical section of the same; and fig. 3, is another vertical section. The wall of the kiln is constructed principally of brickwork, as shewn at *a, a,* and is built as usual in the form of an inverted truncated cone, having an open top. The cement, stone, or other material is thrown in from above, and as it becomes calcined by the heat it is drawn away from the lower part through the openings *b, b.* The annular water chamber or boiler is shewn at *c, c;* it is surrounded by a flue *d,* and is provided with a man-hole *e,* and safety valves *f, f.* A series of horizontal tubes *g, g,* extend across the kiln for the purpose of causing the water to circulate freely throughout the chamber. The steam generated in the boiler *c, c,* is conducted through the pipe *h,* to any place where it may be required to drive an engine. A small furnace *i, i,* (see fig. 3,) which is denominated the "regulator," is adapted to the kiln for the purpose of regulating the pressure of the steam and maintaining it at a given point. This furnace is of small dimensions, and communicates directly with the annular flue *d,* which surrounds the water chamber or boiler, and terminates in the chimney *j.* Fig. 4, is a sectional view of a modification of the above-described arrangement. In this instance the external additional furnace or regulator *i, i,* is dispensed with, and, in lieu thereof, a small vertical boiler *i*, i*,* is mounted on brickwork in the centre of the kiln, where it will be surrounded by an intense heat: the horizontal pipes *g, g,* extending from the sides of the annular water-chamber *c, c,* terminate in this central vertical boiler, instead of passing directly across the kiln, as in the former instance.

The patentees claim constructing kilns for burning or calcining cement, stone, chalk, limestone, and other substances requiring such process, in the manner described; so that by the adaptation of a water chamber or boiler, steam may be generated by the waste heat arising from such calcining or burning process, and be employed for any purpose for which it may be required.

To William Edward Newton, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in machinery or apparatus for sewing,—being a communication.*—[Sealed 19th October, 1852.]

This invention relates to a novel arrangement or combination of parts, whereby fabrics may be sewn or connected together with thread or yarns by mechanical means; and consists principally in combining together, in the operation of sewing, two threads in such a manner that each of the threads is made to hold or secure the other in the fabric.

In Plate IX., fig. 1, is a plan view of the horizontal table on which the fabric to be operated upon is placed; the horizontal needle, with the parts for operating it, being represented partly by dotted lines, as they are situated beneath this table. Fig. 2, is a vertical section taken in the line A, B, of fig. 1; fig. 3. is a vertical section taken in the line C, D, of fig. 1; fig. 4, represents the mode of constructing the parts which carry the spools that receive the thread, together with the arrangement for tightening the spools thereon, so as to obtain the proper degree of tension upon the respective threads; and fig. 5, is a diagram, representing, upon an enlarged scale, the peculiar stitch produced by the machine. *a, a, a,* represent the framework of the machine; and *b, b,* is the vertical needle which is supplied with thread from the adjustable spool *c, c.* The needle *b,* is made to move up and down by the bent lever *d, d,* which turns on a fulcrum at *e,* in the framework *a, a;* and the stud *f,* of the said lever plays in the grooved wheel *g, g,* on the driving-shaft *h, h,*—thereby causing the vertical needle to move up and down. The horizontal needle *i, i,* (see fig. 1,) is made nearly circular instead of straight. Although a beneficial result might be obtained without adopting precisely the form shewn, yet this circular form of needle is preferred, as it is better adapted for opening the loop of the thread of the vertical needle, and also for spreading the loop of its own thread. The horizontal needle *i, i,* is made to rotate intermittently in the following manner:—The end of the said needle is bent, so as to be inserted in the pinion *k,* into which works the toothed rack *l,* which is attached to the bent lever *m, m,* the stud *n* of which works in the excentric groove *o, o,* on the central cam of the driving-shaft *h, h,* as shewn by dots in fig. 1. The thread which supplies the needle *i, i,* is wound upon the spool *p,* and passes from the said spool through the end of the small spring h^1, and also through the end of the bent

lever *q*, to which the spring h^1, is attached. From thence the thread passes through the guiding bar *r*, and through the point of and around the needle *i, i*, which is grooved for the purpose. This, with its thread, passes through the loop of the thread of the vertical needle, and forms another loop. Beyond and through this loop the vertical needle passes; and the two needles thus operate together, and form the double loop stitch, in the manner shewn at fig. 5. The bent lever *q*, is attached to the bent lever *m, m*, and is moved backward and forward by it; and, in connexion with the small spring h^1, takes up the slack of the thread of the needle *i, i*.

The arrangement for tightening the spools, and producing a proper and even tension upon the respective threads, is as follows:—i^1, fig. 4, represents the rod or axis upon which the spool turns; this rod is secured in the framework *a*, a^1, and at the foot of and around the rod a spring g^1, is placed. This rod i^1, is furnished with two small metallic cones; and the spool is made to rest upon the conical ends of the small metallic cones, which are inserted in the opposite ends of the spool, as shewn by the figure. These cones are allowed to slide up and down upon the rod i^1, and are prevented from rotating with the spool by means of pins or projections running from them into a slot made in the rod i^1, for the purpose. To alter the tension upon the threads, the nut k^1, is screwed down upon the outer cone, or upwards from it.

The apparatus for feeding forward the cloth or other fabric to be sewn, is represented more particularly in fig. 2, and consists principally of a bent bar *s*, s^1, the upper end of which is notched to hold the cloth, and extends above the platform. The bent bar *s*, has a reciprocating vertical motion, and also a horizontal motion imparted to it in the following manner:—The bar *s*, s^1, turns on a pin *t*, as a fulcrum, and has also a slot made in it so as to allow it to slide on the said pin or fulcrum. The bar *s*, s^1, is pressed up by the cams *v, v*, on the driving-shaft, and is forced back again by means of the spring *w*, attached to the framework *a, a*. The bar is also moved back by the cams *x, x*, striking against the projection *y*, and by the spring *z*. In fig. 2, the vertical needle *b, b*, is best seen with the eye, formed at a proper distance from the point, and fixed in the socket end of the needle bar o^1, o^1. which is made to move up and down as above stated. The thread first passes from the spool *c, c*, through the end of the small spring n^1, and thence through the eyelet p^1, and down between the semicircular projection m^1, fig. 2, and the small wheel l^1, which wheel is pressed by a small spring

against the projection m^1, and is turned upon its axis by the friction of the said projection against it. It will be seen that the projection m^1, moves upward and downward with the needle-bar o^1, and thus turns the wheel l^1, in passing and repassing it. If the pressure of the projection m^1, against the wheel l^1, is found insufficient to take up the slack of the thread of the vertical needle b, it may be wound once around the projection m^1, in passing.

In fig. 3, q^1, represents a small guide which is used in putting binding upon cloth or leather; it is bent in the proper shape for folding the binding upon the edge of the fabric, and has a proper slot in it through which the binding passes when folded. This guide q^1, is so arranged that it may readily be removed from the machine when other work is to be done, or it may be exchanged for one of larger or smaller size, as may be required by the width of the binding to be used.

The cloth or fabric to be sewn is placed upon the notched bar s, s^1, fig. 2; and in order to hold it upon the same while the stitch is being made, it is pressed by the vertical motion of the bar b^1, b^1, which is attached to the sliding rod c^1, c^1, on the upper end of which the spring d^1, bears. As the work progresses, the cloth will be held upon the notches of the bar s, s^1, by the striking of the bar against the yielding plate b^1, b^1; and the cloth will be fed along after each stitch by the horizontal motion of the bar s, s^1,—the downward motion of the bar s, as above described, releasing the cloth from the pressure of the plate b^1, b^1, so as to allow it to be fed along.

The operation of the machine is as follows:—The fabric to be sewn is placed upon the platform a, a, which has a proper hole in it for the play of the vertical needle, which passes downward through the fabric and forms a loop on the under side thereof; and the horizontal needle then passes through this last-formed loop, and forms another loop beyond, and holds the first loop until the vertical needle is drawn up and pressed down again through the loop formed by the horizontal needle, which draws up the loop first made, and forms the double-loop stitch, as before described.

The patentee claims, First,—the making of a seam by carrying a first thread through the fabric to be sewn, and passing the loop of a second thread through the loop of the first thread formed on the under side of such fabric; and again carrying the loop of the first thread through the last-formed loop of the second thread, and thus forming the double-loop

stitch, substantially in the manner set forth. He also claims the use of two needles, operating alternately,—one working vertically and the other horizontally, substantially as hereinabove described, and forming, by the double-loop stitch, a seam, as set forth. Secondly,—the arrangement, above described, for feeding the cloth along under the vertical needle, or any modification thereof, consisting of a notched bar, which has a vertical or up-and-down motion for holding the fabric upon, and releasing it from the notches of the said bar, by striking it against a yielding plate; and having also a lateral motion, or motion forward and back, for feeding the cloth along after each stitch, substantially as above set forth. He also claims the arrangement, above described, for taking up the slack of the thread of the horizontal needle; and the arrangement for taking up the slack of the thread of the vertical needle, as above described. Likewise,—the arrangement, above described, for folding the binding upon the fabric to be sewn, as well as the arrangement for tightening the spools and procuring a proper and even tension upon the respective threads; namely, the use of cones so arranged that the spool is made to turn upon the conical ends of them.

To Gabriel Benda, *of Basinghall-street, merchant, for improvements in apparatus for obtaining fire for smokers.*—[Sealed 19th October, 1852.]

This invention consists in making fusees, intended for lighting cigars and pipes, so that they shall burn with a flame; and likewise in constructing a case for holding and protruding such ignitible material. In carrying out the first part of this invention, a long strip of linen, paper, or other suitable substance is prepared with the composition usually employed in the manufacture of fusees; and in order to make the same burn with a flame, a piece of linen or other suitable material, is saturated with wax, sperm, or a solution of caoutchouc, or other highly inflammable material, and attached to one side of such fusee. These fusees, thus prepared and capable of burning with a flame, are placed in the improved case, which constitutes the second part of this invention, and is shewn in side elevation in Plate IX., at fig. 1, and in section at fig. 2. The body of this improved apparatus consists of two parts, *a*, and *b*; the part *a*, containing the reserve of fusee, as previously described, and the part *b*, forming a cover for the same. *c*, is a wheel formed with teeth or projections on its

periphery, worked by a stud *d*, on the outside of the case *a*; *e*, is a compensating guide-piece, which keeps the paper or fusee against the wheel while being protruded, and terminates in a flat head at *b*, on which the fusee is supported while the fire is being obtained; *g*, is a guard-piece, to prevent the coil of fusee coming in contact with the wheel *c*; *h*, is a collar which is slipped over the two cases and keeps them together; and *i*, is a cover for the mouth of the case, which is roughened at its outer end, and forms a finish to the apparatus. When it is required to use this apparatus, the cover *i*, is taken off, and a portion of the fusee is made to protrude by turning the stud *d*; fire is then obtained by striking the fusee with the cover against the end of the guide-piece *e*. It will readily be seen that any surplus fusee, protruding from the case, can be withdrawn by turning the stud and wheel in the reverse direction.

The patentee claims, First,—the improvements in fusees hereinbefore described, whereby they are capable of burning with a flame; and the making of the same in long coiled strips. Secondly,—the combination of apparatus hereinbefore described; that is to say, of a case containing a coil of fusee or other ignitible material, which is caused to protrude and recede by means of a wheel or rack, or by any other equivalent means.

To WILLIAM DAVIS, *of Leeds, machinist, for improvements in machinery for cutting files.*—[Sealed 11th November, 1852.]

THE patentee commences his specification by remarking that, in the machinery hitherto employed for cutting files, the cutting instruments are usually made to strike the face of the blank, and thereby cut the teeth of the file thereon, as the blank is passed through the machine. A complicated arrangement of mechanism is required to impart the requisite motions to the cutters and blank; and, as only one side of the file can be thereby cut at the same time, a considerable expenditure of time takes place in the operation of cutting and changing the blank; which must, of course, be passed twice through the machine before it can be completed. To obviate these objections, it has been proposed to employ a pair of cutters—one acting on one side of the blank and the other cutter on the other side. The cutters are made to strike simultaneously; so that the one cutter acts as a bed or rest to sustain the blank against the blow or pressure of

the other cutter. This arrangement is likewise open to grave objections, and the work produced thereby is far from perfect. These difficulties are, however, obviated, by employing the improved machinery, in which the cutters are made stationary, and do not impart any blow to the blank. By this means the complicated machinery, hitherto necessary to actuate the cutters, is dispensed with; as it is only necessary to set them at the proper angle to form the teeth of the file, and to arrange and construct their bearings in such a manner as to allow a little play, so that the blank may pass between the cutting edges. Instead of striking the blank a smart blow with the cutters, as has hitherto been the case, the blank has a slight vibratory or reciprocating motion communicated to it, as well as an onward or progressive motion. Thus the blank is driven forcibly against the cutting edges, and the teeth are thereby formed on both its faces simultaneously. The progressive onward motion of the blank is effected by a screw, and the short backward motion, to bring the faces of the blank against the cutters, is produced by a crank or excentric, which acts on the carriage whereon the blank is fixed.

In Plate IX., fig. 1, is a front view, and fig. 2, is a vertical section of the improved machine. *a*, is the standard, to which an upper frame *b*, is bolted. These frames carry two distinct slides *c*, and *d*,—the slide *d*, being mounted upon the slide *c*, and gradually moved therein by the screw *e*, as the cutting operation proceeds. The screw *e*, is also mounted in the slide *c*, in the line × ×, fig. 1. The tail end of the blank *g*, to be cut, is placed in a ball *f*, that works in a socket of the slide *d*, and bears against a screw *h*, of the slide-frame *e*, that keeps the blank at its proper inclination. The holders *i*, that carry the cutters *j*, are moveable, and turn on pins that work in bearings screwed to the frame *b*. *k*, is an oscillating lever, carried by the frame *b*. This lever is shewn detached at fig. 2, and is furnished with two fingers *l*, and *m*, that are caused, by a weak spring *n*, to embrace the file blank immediately below the cutters, in order to support and keep them up to their work, and make them bite and dig into the blank as the frame *c*, is moved upward by the cam *s*. A balance-weight *o*, is hung on the outer end of the lever *k*, for the purpose of balancing the weight of the cutters, which, at all times, rest upon and are supported by the fingers *l*, and *m*. When it is required to produce a file, the blank of which is taper, (as shewn at fig. 2,) a strip of metal, corresponding to the taper, is placed on that side which rests against the screw

h; so that, as the taper blank descends, it will, by means of the strip *p*, be always kept at the same inclination; and, as the cutters act horizontally, the cuts on the sides of the blank will form an obtuse angle with the line of its descent. The ball *f*, or file-holder (as it is technically called), has its surface graduated, and a hole is made in the frame *d*, at *g*, through which these graduations may be seen and read when desired, as will be necessary when producing round or circular work. When triangular or half-flat files are to be cut, only one cutter is used, and a sustainer or bed of metal is applied on the opposite side, and rests against the side of the slide *c*. The driving-shaft *r*, is mounted in bearings in the frame *b*, *b*, and is furnished, at one end, with a fly-wheel and driving-pulley; there is also a crank or cam *s*, and worm *t*, mounted upon it; which worm gears into a wheel *u*, on the shaft *v*, and, by means of a wheel *w*, taking into the wheel *x*, gives motion to the screw *e*, of the frame *c*, and causes the sliding-frame *d*, and file blank, gradually to descend, as the cutting operation proceeds. Before commencing the operation of cutting, it is necessary to adjust the position of the frame *d*, and set it to the proper height. This is effected by turning the screw *e*, whereby the sliding-frame *d*, may be raised or lowered, as required. It should be understood that the lower end of the shaft *v*, turns in an excentric bush *y*, mounted in a bracket extending from the frame *a*; and when it is required to adjust the position of the sliding-frame, the wheels *w*, and *x*, must previously be thrown out of gear. This is done by turning the bush *y*, which operation has the effect of drawing back the wheel *w*,—thus leaving the wheel *x*, and screw *e*, free to turn, independent of the other moving parts.

The operation of this machine is as follows:—On rotatory motion being communicated to the shaft *v*, the cam *s*, will raise the frames *c*, and *d*, with the blank *g*; and the lever *k*, being mounted on the frame *b*, will also rise. The fingers *m*, and *l*, carry upwards the edges of the cutters *i*, *i*, and by thus forcing them back, cause them to dig into the blank, as it is forced up by the vibratory or reciprocating motion of the frame *c*. By the surface of the blank being thus forced against the cutters, the teeth of the file are cut therein, and, by a series of such operations, a perfect file will be produced. On the cam *s*, continuing to rotate, the frame *c*, will be drawn back by the spring *z*, ready to make a fresh stroke upwards. During this time, the blank is caused to descend a short distance, by the agency of the worm *t*, the wheels *x*, *w*, shaft *v*,

and screw *e*,—so as to bring a fresh part of the blank surface for the cutters to act upon.

The gauge or fineness of the file to be produced, is regulated by the change wheels and the adjustable screw I, which regulates the amount of motion of the slide *c*, and consequently the depth of cut. The distance of one cut from the other, on the faces of the blank, is regulated by changing the wheels *w*, and *x*, for others of the desired proportion.

The patentee claims, the cutting files, by forcing the blank up against a cutting tool or tools, instead of causing the tool to strike the blank as heretofore. Secondly,—the arrangement of mechanism, or any mere modification thereof, whereby files may be cut on both sides simultaneously. Thirdly,—the arrangement, above shewn and described, for adjusting and regulating the fineness and depth of the cut, and also the employment of a cup-and-ball joint, as the holder of the blank, and the adaptation thereto of a graduated part, which may serve as an index for circular work.

To JAMES OTAMS, *of Horton Villas, Holloway, Gent., for improvements in the manufacture of manure.*—[Sealed 19th October, 1852.]

THIS invention consists in combining blood in its natural state with sulphuric or other acids, and then mixing phosphates therewith, which act as driers, and are themselves acted upon by the acid. In carrying out this invention, the patentee takes at the rate of 150 gallons of blood, as it is collected in the slaughterhouse or elsewhere, and passes it through a sieve; and all the clots or coagulated portions are broken by being well stirred and heated in a vessel suitable for the purpose, which is preferred to be made of wood lined with lead. Into this proportion of blood, 7 cwt. of (by preference) brown sulphuric acid of commerce is stirred; but other acids may be employed in the same manner as when decomposing bones and mineral phosphates. Two cwt. of animal charcoal or bone black, and 8 cwt. of coprolites or mineral phosphate is then added,—the combined mass being well stirred till the active action of the acid ceases. This mass is then removed from the vessel and allowed to dry in bulk, and is then ready for use as a manure. If desired, the manure thus obtained may be mixed with other matters, as is the practice when using decomposed phosphates.

The patentee claims the mode herein described of manufacturing manure, by combining blood in its natural state with acid and phosphates.

To JULIEN BOILESVE, *of North-terrace, Brompton, engineer, for an improved mode of preserving vegetable substances and animal coatings.*—[Sealed 22nd October, 1852.]

THIS invention relates to a mode of preserving grain, vegetable substances, and animal coatings; also of stopping their decomposition, when already affected, and rendering them fit for use; and for destroying all the insects by which they may be attacked and deteriorated. These objects are effected by the employment of chlorine or sulphurous gas, which will expand under a bell, box, air-tight cloth, or other similar contrivance.

In order to carry out this invention, the substances intended to be operated on are placed in any suitable air-tight apparatus, and the chlorine is introduced and directed therein by means of a tube. The substances to be treated are so arranged that the gas can penetrate into all their parts, by placing any required number of sieves, one upon the other, in such a manner that the edge of one sieve shall rest upon the edge of another, and a vacant space will be left between each for the circulation of the gas.

A modification of this arrangement is also described. In this instance, a pierced cylinder is provided for containing the grain to be operated upon, and placed in any suitable air-tight chamber, into which the gas is admitted. The cylinder being put slowly in motion, by any convenient means, will expose the grain—while traversing the interior of the cylinder from one end to the other—to the action of the chlorine, which will escape by the lower part of the apparatus.

The patentee claims, First,—the employment of chlorine or other sulphurous gas, for the preservation of all kinds of vegetable substances, animal coatings, and also for the destruction of insects, as herein described. And, Secondly,—the direct application of chlorine or sulphurous gas in an air-tight vessel or chamber, as hereinbefore described.

To WILLIAM EDWARD NEWTON, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in lamps, and in apparatus to be used therewith,—being a communication.*—[Sealed 21st December, 1852.]

THE object of this invention is to construct a lamp, in which the most inflammable spirituous compounds may be burned with entire safety, and with which no accident can arise, either from the bursting of the lamps, or from the carelessness or

ignorance of those using them. The inventor remarks that it is well known that if the flame of a lamp be surrounded by wire gauze, in the manner adopted in the Davy safety lamp, generally used in mines, that the lamp may be introduced into inflammable gas without danger of igniting it; and it has furthermore been discovered that similar wire gauze is a bar to the ignition of gas, proceeding from highly inflammable liquids in a state of ebullition, and even to the passage of the flame of the burning liquid itself; so that a gauze cylinder may be placed vertically in a vessel of such liquid, which may then be ignited within the cylinder, while the fire will fail to communicate to the liquid without, in a manner analogous to that in which, when the Davy lamp is introduced into a gas which entirely surrounds it, the latter will burn upon the inside of the gauze, without igniting the body of the gas.

In Plate VIII., fig. 1, is an exterior view of a lamp, constructed according to the present improvement; fig. 2, is a modification of the same; fig. 3, is a plan, and fig. 4, a vertical section of the modification represented in fig. 2. Fig. 5, is a vertical section through fig. 1; and fig. 6, is a vertical section through the line A, B, of fig. 3.

In figs. 1, and 5, *a*, is a cylinder of fine wire gauze, secured to a cap-piece, screwed into or otherwise conveniently attached or adapted to the upper part of the lamp: the bottom a^1, of this cylinder is also made of the same wire gauze. This cylinder descends to within ¼ inch, more or less, of the bottom of the chamber containing the liquid; it is carefully put together with solder, so that there may be no holes in the cylinder larger than the meshes of the gauze. *b*, (see fig. 5,) is another cylinder of similar gauze wire, soldered to the metal ring *c*, and having a screw *d*, which fits into another screw in the lamp-cap *g*. *h*, is the hole through the lamp-cap, which may now be used with safety, as there is no longer danger of the flame from the wicks being communicated to the gas within. The wick having been passed through the tubes *k*, lies coiled within the interior cylinder *b*; and when it becomes necessary to replenish the lamp, the cap *g*, gauze cylinder *b*, and wick, are removed together. The liquid in this lamp is never entirely exhausted, as the exterior cylinder, as before stated, and consequently the interior one, and the wick which it contains, do not reach to the bottom of the lamp.

With a lamp of this construction the cap, together with the interior gauze cylinder, may be removed, and the vapor from the alcohol, or other inflammable liquid, may be ignited within the exterior cylinder without danger of the flame being

communicated to the gas upon the other side of the gauze; and if the surface of the liquid itself be fired, it will burn slowly within the cylinder, and in no case be communicated to the liquid upon the other side of the gauze. When the interior cylinder is in its place, as is always the case when the lamp is in use, a double protection is afforded: the principal use of this cylinder is, however, to contain the wicks, so that it may be removed with the cap when the latter is unscrewed to replenish the lamp.

In figs. 2, 3, 4, and 6, is shewn a modification of the lamp, in which the cap is not removed when the lamp is to be replenished. *m*, is a circular opening in the cap *o*. Beneath this hole the short cylindrical or other shaped piece *n*, is secured to the cap *o*. The hole *m*, is closed by the screw-cap *p*, through which is a perforation, seen in section at fig. 6, similar to the one in the lamp-cap already described, and for a similar purpose. When the lamp is to be replenished, the screw-cap *p*, is withdrawn, and the liquid is poured into the gauze *n*, at the opening *m*. This, like the modification first described, is also found to afford perfect protection, as the liquid and gas may be ignited at the opening *m*, without the possibility of the flame passing through the gauze into the lamp.

In this form of lamp it is intended that the cap *o*, shall be removed only when the wick requires to be replenished; and it becomes necessary that some method should be devised to prevent the wick from being accidentally withdrawn into the lamp, as this would require the lamp to be opened; and for carrying out this object, springs *r*, *r*, fig. 4, are provided within the lamp tubes, which, by pressure, retain the wicks within the tubes, while they allow them to be easily withdrawn as they become consumed and require to be cut off. This is effected by placing a disc of the gauze over the large opening over the can, or that through which it is filled, and a similar disc of gauze to protect the way to the small opening through which the liquid is fed to the lamps.

The first lamps, constructed upon this principle, were furnished with gauze made of brass or copper wire; but these metals were found to corrode rapidly in the various mixtures of camphine or turpentine, so as to render them entirely unfit for illuminating purposes. Various experiments were instituted to remedy this evil; and it was ultimately discovered that where the wire gauze had received a slight coating of silver, no such corrosion took place, and the fluid was entirely uninjured by the contact of the metal. This pre-

caution is now, in all instances, resorted to, and no inconvenience is experienced from the corrosion of the metal.

The patentee claims the interposition of wire gauze between the inflammable liquid within the lamp and the opening in the same through which it is filled, in any manner calculated to accomplish the end desired. Secondly,—the method of accomplishing this end by means of the cylinder *a*, attached to the body or other convenient part of the lamp, as set forth in the drawings. Thirdly,—as a modification of this device, the method represented at figs. 2, 3, 4, and 6. Fourthly,—the combination of the interior cylinder *b*, with the lamp-cap *g*, as represented at fig. 5, for the purpose set forth. Fifthly,—the combination of the wire-gauze cylinder with the perforation, operating in manner described, whether it be arranged in the manner represented at fig. 6, or any other manner substantially the same. Sixthly,—the method of protecting the wire gauze from the action of the camphine, or other resinous compounds, by coating it with silver in the manner set forth.

To George Shand, *of Glasgow, and* Andrew Mc Lean, *of Edinburgh, chemists, for improvements in obtaining products from tar.*—[Sealed 5th November, 1852.]

This invention has reference to the treatment of tar, for the purpose of extracting its products, and rendering the same available for useful purposes; whether the tar to be so treated be obtained from wood, coal, or animal substances.

In order to accomplish these objects, the tar is submitted to the following processes:—In the first place, crude or rough naphtha and ammonia is distilled over, in the usual way, from coal or gas tar; and, by further distillation "pitch oil," "tar oil," or "creosote oil," is obtained, which the patentees denominate crude "naphthaline oil." Secondly, this oil is purified by means of acids and alkalies, in the manner hereafter described; and from the oil so purified, the naphthaline, and also a lighter and a heavier oil, is extracted. And, lastly, tar obtained from wood or animal substances, is submitted to the same processess, to extract therefrom the crude oil, to purify it, and to separate from it the purified oils, and the denser substances contained therein. In order to carry into effect the first series of processes, forming part of this invention, the patentees take coal or gas tar, and put it into a still of any suitable construction, with a worm and condensing apparatus attached thereto, and, by means of steam passed into the still

from a steam-boiler, the crude or rough naphtha is distilled over in the usual way until the crude naphtha coming over from the still becomes of the specific gravity of about 910°. (water being considered 1000°.) The steam is then shut off, and, by the application of heat from a fire, a quantity of water is distilled over, as well as the previously mentioned naphthaline oil, which is commonly called pitch oil, tar oil, or creosote oil. The distillation is still continued until the oil reaches the specific gravity of about 990°; the fire is then withdrawn; and the residue of the pitch in the still is run off, in a heated state, and allowed to cool in the usual way. A further quantity of oil may be extracted from the pitch by subjecting it to a strong fire heat in a retort, with a worm and condensing apparatus attached thereto.

The second part of the process relates to the purification of the crude naphthaline oil, and the extraction therefrom of the naphthaline and oils which it contains. For this purpose the crude naphthaline oil is put into a leaden vessel, and to every 100 gallons thereof about 15 gallons of sulphuric acid of the specific gravity of about 1.830, is gradually added,—the mixture being continually stirred until the acid has become mixed with all the impurities with which it can combine. The contents of the vessel are then allowed to settle; and the clear liquor is drawn off into another vessel. To every 100 gallons of oil abont 10 gallons of caustic alkali, having the specific gravity of about 1.350, is next gradually added; and this mixture is kept continually stirred, until any excess of acid left in the oil is neutralized, and all other impurities with which the alkali can combine, are taken up. The contents of the vessel are then allowed to settle; and the clear liquor is drawn off and put into a still of any convenient construction, with a worm and condensing apparatus attached.

The process of distillation is carried on until the oil coming over reaches the specific gravity of about 940°. The oil from the still is then run into a second vessel (leaving the former product of distillation in the manner hereinafter described); and the process of distillation is continued until the contents of the still are run off. The oil, so distilled, is next treated with a small quantity of caustic magnesia, in a dry state, for the purpose of absorbing any trace of water remaining in it. When the oil has been allowed to settle, and has undergone filtration, it is ready for use, either alone or mixed with other oils: this manufacture of oil the patentees denominate "purified heavy naphthaline oil."

The inventors then take the former product of the dis-

tillation of the crude naphthaline oil, before mentioned, and put it into any convenient still, with a worm and condensing apparatus attached, and to every gallon of oil about one pound weight of caustic lime, or burnt lime shells, are added. The oil and lime, having been well stirred together, are acted on by a gentle heat from a fire; and a light volatile oil is distilled over, which is afterwards rectified by means of steam from a steam-boiler, and passed into any suitable still, with a worm and condensing apparatus attached: this manufacture of oil is useful for solvent and other purposes. The distillation is still continued until the product reaches the specific gravity of about 910°, when a stronger heat is applied from the fire, and the oil is run from the still into a second vessel,—the operation being continued until the contents of the still are distilled over. The oil last distilled is then allowed to cool down to a temperature of from 30° to 40° Fahr., when the naphthaline will be deposited at the bottom of the vessel, and may be separated from the oil by filtration and pressure. The oil from which the naphthaline has been separated, and which is called by the patentees "light naphthaline oil," is treated with magnesia or other substance, in a dry state, to absorb any trace of water; and, when filtered, is ready for use. Naphthaline may also be obtained by treating the purified heavy naphthaline oil with caustic lime, in the manner above described. In order to purify the naphthaline, after it has been separated from the naphthaline oil, the naphthaline is put into a retort, or any convenient apparatus, and, with a gentle heat, it is sublimed in vapour into a wooden chamber, where it condenses in flakes of a white color.

The last part of this invention consists in applying the series of processes, above described, to tar, obtained from wood or animal substances. For this purpose the tar, thus obtained, is treated in a similar manner to that described in reference to the purification of crude naphthaline oil, and the heavier and lighter oils, and also the denser substances, extracted and separated therefrom,—such oils and denser substances being purified in the manner above described, in reference to the heavier and lighter naphthaline oils and the naphthaline.

The patentees claim, First,—the purification of the crude oil produced from tar by distillation, as described. Secondly,—the further treatment of such oils in a purified state, and the separation therefrom of heavier and lighter oil, and the denser substance contained therein, as described. And, Lastly,—the purification of such last-mentioned products, as described.

To Robert Mortimer Glover, *of Newcastle-upon-Tyne, M.D., for improvements in coating the bottoms and other parts of ships and vessels, in order to prevent animal and vegetable growth in contact therewith.*—[Sealed 24th November, 1852.]

This invention consists in preparing paints or varnishes for coating the bottoms and other parts of ships and vessels, by employing arsenite or arseniate of lead, with or without the addition of the red or yellow sulphurets of arsenic. The arsenite of copper and the red or yellow sulphurets of arsenic, commonly called realgar, and orpiment, are the substances best suited for mixing with the arsenite or arseniate of lead. These may be combined in the proportion of two parts, by weight, of arsenite or arseniate of lead, one part of realgar, one of orpiment, and one of arsenite of copper. The means pursued by the patentee, for preparing the arsenite or arseniate of lead, is as follows:—Arsenious acid or arsenic acid is dissolved in a boiling solution of carbonate of soda, and a solution of nitrate of lead is then added; by which a precipitate of arsenite or arseniate of lead is obtained, which may be washed with water and then dried. The matters are to be mixed, prepared, and applied in the ordinary manner of using pigments.

The patentee claims the application of arsenite or arseniate of lead in the manufacture of paints or varnishes; and the combining therewith of red or yellow sulphurets of arsenic and arsenite of copper.

To James Higgin, *of Manchester, manufacturing chemist, for improvements in the manufacture of certain mordants used in preparing woven or textile fabrics, for printing, staining, or dyeing them, and in the mode or method of using the same or other mordants for the said purposes.*—[Sealed 24th November, 1852.]

This improvement consists in the manufacture of a compound mordant, containing oxide or oxides of tin and alumina combined with an alkali; so as to form a solution containing stannite or stannate and aluminate of the alkali employed,—soda being the most desirable alkali to use for this purpose. In order to form one of the compound mordants, which the patentee calls "alumino-stannate of soda," perchloride of tin is precipitated by caustic soda, and the oxide is re-dissolved in more of the alkali, whereby stannate of soda is obtained;

and if stannite of soda is required to be obtained also, in solution, a little protochloride of tin is mixed with the perchloride before precipitation. To this solution aluminate of soda is now added, which may be made as follows:—Alum is put into a convenient vessel, which may be in such proportion that, for every fourteen pounds of metallic tin in the stannate solution, there shall be one pound of alumina or oxide of aluminium. To this solution caustic soda is gradually added, till all the alumina, which was at first precipitated, has been re-dissolved. This is then mixed with the stannate solution, and the mixture is ready for use; or, if a dry form be preferred, the solution may be boiled down to a state of dry powder, which will require only to be re-dissolved in water. In using this mordant it is diluted to about 12° Twaddell, and the goods are padded in the solution, as is well understood by calico printers. The cloth is then soured with dilute sulphuric acid, as is at present practised with stannate of soda. By this means a compound of alumina and oxide of tin is fixed in the cloth, which, after washing and drying, is ready for printing upon. In some cases it may be convenient to pad the goods in stannate of soda, as at present; and, instead of sulphuric acid, to use dilute solution of an aluminous salt, or to put a portion of an aluminous salt into the sulphuric sours; or the goods may be padded in alum solution first, and afterwards in stannate of soda, souring or not as may be requisite. By any of these means a compound of alumina and oxide of tin will be fixed in the cloth, but it is preferred to use the alumino-stannate of soda, as before described. An acid compound of alumina and oxide of tin is also made, by adding to any of the chlorides of tin, chloride of aluminium, made by precipitating the earth of alum with an alkali, and, after washing the precipitate, re-dissolving it in strong muriatic acid,—using about the same proportions between the tin and the alumina, as before stated.

The patentee claims, Firstly,—the manufacturing alumino-stannates of an alkali, to be applied to the ordinary purposes for which the stannates of soda are employed. Secondly,—the manufacturing compound acid mordants, containing a salt or salts of alumina, and a salt or salts of tin, in combination, to be used as the chlorides of tin are used in the arts of dyeing and calico printing. Thirdly,—the fixing any compound of alumina, and oxide or oxides of tin, on the fabric, by padding or immersion previously to printing or dyeing.

To William Brown, *of the City of Glasgow, merchant, for an improved method of treating coal and bituminous substances, and for improvements in the treatment of their volatile products.*—[Sealed 13th January, 1853.]

The first operation consists in distilling the coal, or other bituminous matter, in conjunction with steam, at a dull red heat; and, for this purpose, the coal or other bituminous matter is introduced into a retort fitted with a steam-pipe, so situated as to become red hot by passing through the furnace. This steam-pipe terminates in the closed end of the retort; so that, when the retort is charged with coal or other bituminous matter, and the furnace is in action, the steam-pipe becomes red hot,—and steam being then passed along it, this also becomes red hot; and, in this state, enters the end of the retort, and rapidly unites with and expels the volatile matters arising from the coal or other bituminous matter; by which means their decomposition into gas is wholly, or in great measure, prevented, and the amount of oily or condensible product greatly increased.

The steam-pipe may, if preferred, be passed through a furnace, distinct and separate from that which heats the retort; which arrangement admits of the withdrawal of the fire from the retort, or the diminishing of its intensity at pleasure, without altering the temperature of the steam-pipe. By this means the distillation of the coal or bituminous matter can either be continued altogether, or in part, with the retort at a temperature below that of a dull red heat. The steam-pipe may be of cast-iron, or of cast or wrought-iron, glazed or enamelled, as it is termed; or it may be of clay or earthenware. In distilling, a condenser is employed as usual, the temperature of which should not be lower than 50° Fahr.

A quantity of volatile products having been thus obtained from coal or other bituminous matter, these are again subjected to distillation, in a still or other convenient vessel, with or without the employment of a steam-pipe, though the use of steam is preferred when a large amount of paraffine is required; but where the production of oil is the chief object, steam may be dispensed with. When steam is used, it is to be brought into the still, in a superheated state, by passing it through a red hot steam-pipe, disposed in the furnace or flue of the furnace which heats the still. The steam enters through the upper part of the side of the still, and promotes, as before, the distillation of the volatile matters, whilst it retards their destruction or conversion into gaseous or other

worthless compounds. By this means the paraffine and heavy hydro-carbonaceous oils are preserved.

During the progress of the second distillation it will be observed, that the products vary at the different periods of the distillation; and these are, therefore, to be kept separate, or received in different vessels. At first a thin oil or impure eupione oil comes over to the extent of about one-eighth of the total fluid employed; after this a thicker and heavier oil, containing paraffine, makes its appearance, to the extent of from 40 to 50 per cent. of the fluid employed; and, lastly, a thick butyraceous matter is evolved, consisting chiefly of paraffine, but mixed with heavy oil; and this continues to the end of the operation, and constitutes about one fourth of the bulk of the fluid originally used.

These three products are treated as follows:—The impure eupione oil is mixed with from 5 to 10 per cent. of its weight of oil of vitriol or sulphuric acid, to which an equal bulk of water is added: bichromate of potash is next thrown in, equal in weight to one-half of the sulphuric acid employed; the whole is then heated in any convenient vessel of wood, lead, or earthenware; and during the heating, the materials are diligently stirred together. As soon as the temperature has reached 212° Fahr., the heating means may be withdrawn, and the whole permitted to cool and settle.

The eupione oil is next to be decanted from the acid fluid, and treated with a warm solution of caustic soda,—the whole being well mixed and afterwards left at rest for some time to settle. Lastly, the eupione oil is decanted from the alkaline fluid and distilled, either alone, or with water, or steam, as is practised with respect to volatile oils generally. The heavy oil, containing paraffine, is next treated, either with strong sulphuric acid and peroxide of manganese, in the proportion of ten per cent. of acid and five per cent. of peroxide of manganese, or it is subjected, like the eupione oil, to the action of the sulphuric acid and bichromate of potash, in the same manner and proportion as indicated for the eupione oil; after which it is treated with soda ley, and allowed to settle. The heavy oil is then decanted and distilled in the usual way,—the first portions being added to the eupione oil as consisting chiefly of that substance; the second, and by far the larger portion of the whole, is received apart under the name "lubricating oil;" whilst the last portions, being thick and of the consistence of butter, are mixed with the impure paraffine, which results from the third stage of the second distillation of the crude products, and which are next treated as follows:—

Having allowed the impure paraffine to remain for twenty-four hours, or longer, in a cool place, to crystallize, the oily mixture is placed in a bag or filter, similar to those in use for the separation of spermaceti from sperm oil. When the oily fluid has drained away, the paraffine is removed to a press and subjected to severe pressure, as is practised with respect to stearic acid, by the makers of that substance. It must then be melted and, when cold, again pressed,—the oil being, in both cases, added to the drainings, which are to be treated as explained under the head "heavy or lubricating oil." The paraffine must now be melted, and the heat raised to about 400° Fahr., when strong sulphuric acid is to be carefully stirred into it, in the proportion of from one-twentieth to one-tenth of the weight of paraffine operated upon. After boiling for a few minutes the fire must be withdrawn, and the charred oil of the paraffine allowed to settle in the form of a black powder from the melted paraffine. This being separated, the paraffine must be boiled in water or in a weak solution of soda; after which it may be cooled, and is fit for the market.

The patentee claims, First,—the use of steam, heated as indicated, for the purpose indicated. And, Secondly,—the mode or modes described of purifying the eupione oil, lubricating oil, and paraffine, obtained by the process or processes above described.

To William Maugham, *of Ifield-terrace, in the county of Surrey, for improvements in rendering wood fireproof.*—[Sealed 4th December, 1852.]

This invention relates to treating wood in such a manner as to render it fireproof by dissolving phosphate of soda and muriate or sulphate of ammonia together, in equivalent proportions, and then submitting the wood, when placed in the solution, to pressure. Great care should, however, be taken, that the wood to be operated on is in a thoroughly dry state.

The apparatus which is employed for carrying this invention into effect is the same as has heretofore been employed for impregnating wood with solutions, by withdrawing the air, and then acting by pressure. It is preferred that the wood should be first cut into planks; and when well dried, it is introduced into the apparatus, which is to be filled with the solution. The air is then withdrawn, and pressure is applied gradually for about two hours, till it reaches about 200 lbs. upon the square inch. By allowing the wood to remain in

the apparatus, and subjected to such pressure, for 12 hours, it has been found to be thoroughly impregnated with the solution. The proportions which are most preferable for forming this solution, consist of 176 oz. of crystallized phosphate of soda, and 54 oz. of muriate of ammonia, to 2½ gallons of water. This solution is allowed to stand, and the clear solution is drawn off for use. The wood, when impregnated, is to be removed from the apparatus, and allowed to drain, and become dry; after which, it will be fit for use.

The patentee claims impregnating wood by pressure with a solution containing phosphoric acid with a base.

To Edward Tucker, *of Belfast, for improvements in the manufacture or production of starch.*—[Sealed 6th December, 1852.]

This invention relates to the application and use of certain salts (both alone and in combination with mineral acids), for the more speedy and effective separation of pure starch from the glutinous and other foreign matters with which the starch itself is originally combined, as well as to the neutralizing or counteracting of the injurious effects of the vegetable acids generated in the process of starch-making, and the increase in the amount of good starch from a given quantity of wheat or other grain. By the same means, any pure water is rendered suitable for starch-making, although such water may be ill adapted for this purpose in its natural state. In carrying this invention into effect, the patentee submits the wheaten meal, or reduced grain, to the usual process of fermentation, and washes it, so as to separate the bran from the rest of the materials forming the substance to be treated. The starching liquor is then run into a vat, and allowed to remain for about 36 hours, for precipitation. The supernatant liquor is next run off, or removed, and the precipitate is broken up. A solution of sulphate of soda, or Glauber's salt, in boiling water, is prepared, in the proportion of about 12 lbs. of the salt to 1 ton of the wheat, or other grain under treatment; and after cooling down this solution, it is poured into the precipitated starch; and the vat being filled up with water, the entire contents are thoroughly mixed, and intimately incorporated by stirring. The mass is then allowed to stand for 24 or 30 hours perfectly quiescent. In the subsequent process, technically known as the "fine shift," when the water and slimes are removed, another solution of the same salt is employed, but in much smaller proportions; about 3 lbs. weight only

being applied to 1 ton of wheat. At this stage, in combination with the sulphate of soda, a portion of sulphuric acid is used, in the proportion of about 1 quart of the acid to the produce of 4 tons of wheat. The acid, in a diluted state, is poured gradually into the vat, which is then nearly filled up with fresh water; and the whole contents are thoroughly mixed by agitation. When the starch has been precipitated, it is finished, and prepared for sale, and used in the ordinary manner. The patentee remarks, that he has found sulphate of magnesia, muriate of soda, and other salts and acids, available for a similar purpose. This general process renders all pure water suitable for manufacturing starch, however soft and unsuitable it may have been originally. The pure starch is also better separated from the glutinous constituent of the grain; whilst the manufactured starch is superior in purity, sweetness, strength, fineness of texture, and whiteness, as compared with all starch made in the usual way; and the yield is greatly increased.

The patentee claims, First,—the systems or modes of manufacturing or preparing starch, as hereinbefore described. And, Secondly,—the application and use of earthy or alkaline salts, and mineral acids, for the preparation or manufacture of starch.

To Isaac Lowthian Bell, *of Newcastle-upon-Tyne, for improvements in the treatment of certain compounds of iron and sulphur.*—[Sealed 17th November, 1852.]

In the manufacture of carbonate of soda a certain substance, well known to soda-makers, is very extensively produced, under the name of tank residuum or soda-makers' waste; which residual substance consists principally of sulphur and lime, with more or less of sulphur united to calcium, the metallic base of lime. And there is also produced at works where iron pyrites is used for the manufacture of sulphuric acid, burnt pyrites, or pyrites refuse, containing a large proportion of peroxide of iron. Now this invention consists in treating this tank residuum with oxide of iron, so as to obtain sulphuret of iron.

For the purpose of carrying this invention into effect, the patentee employs a furnace, similar in form and principle to the well-known blast furnace, used in the smelting of iron, urged by a blast of either cold or heated air. This furnace is loaded with fuel, as practised commonly in what is technically called "blowing in" an ordinary blast furnace, for smelting

iron; and when it is suitably filled, portions of the tank residuum, burnt pyrites, and fuel, are introduced, much in the same way as practised in smelting iron, except that the tank residuum and burnt pyrites are used instead of limestone and iron ore; the result being the union of more or less of the sulphur contained in the tank residuum, with more or less of the iron contained in the burnt pyrites; which resulting compound of sulphur and iron—or, as it is hereafter called by the patentee, "factitious pyrites"—fuses and runs down into the bottom or well of the furnace; and, at the same time, the lime of the tank residuum—combining with the silica and alumina furnished by the burnt pyrites, or present from other sources—forms a readily fusible slag, which also runs down to the bottom or well of the furnace; and, being of less specific gravity, collects above the factitious pyrites. After a sufficient time, the furnace is tapped, when the factitious pyrites flows out first, and the slag runs out afterwards, as in the smelting of iron. In this manner the operation proceeds, the furnace being continually charged with fresh materials, and tapped, from time to time, as it becomes necessary. In case the burnt pyrites, tank residuum, and fuel, do not themselves contain a sufficiency of silica and alumina to form the lime of the tank residuum into a slag, some material is added, as a flux, to supply these earths, such as common clay, basalt, burnt bricks, or other suitable substance.

The proportions of tank residuum, burnt pyrites, and earth flux (when the latter is required), are easily adopted by any one acquainted with the management of a blast furnace,—the principle being obviously to use tank residuum, burnt pyrites, and flux, in such proportions as to have sufficient iron to take up all the sulphur of the tank residuum, and sufficient earthy matter to fuse all the lime of the tank residuum into a slag. The following proportions will answer for this purpose:—

Moist tank residuum, as it comes from the soda vats - -	3 parts,	by weight.
Burnt pyrites - - -	3	"	"
Clay or burnt bricks - -	1	"	"

In the same way the quantity of fuel employed may vary; but in this particular the proper working of the furnace may be judged of by the appearance of the slag; for, when the fuel is too little, a portion of oxide of iron escapes reduction, and, passing off into the slag, gives it a very dark color; on the appearance of which more fuel must be added, till the slag is nearly freed from oxide of iron.

The patentee claims the fusion of tank residuum, with oxide of iron, either in the way described or otherwise, so as to obtain sulphuret of iron.

To William Edward Newton, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in the manufacture of carpets,—being a communication.*— [Sealed 29th December, 1852.]

This invention relates, firstly, to the manufacture of three-ply and two-ply printed carpets.

In the fabrication of ingrain carpets it has been customary, in order to produce the figure, to use different colored yarns in the warp and weft: a Jacquard apparatus and a series of shuttle-boxes being also employed and adapted to the loom. Carpet fabrics, such as are generally known as Brussels carpets, are produced, by means of loops, or raised woollen warps, combined with linen warps and filling threads. These may be woven either with or without the figure being brought out in the process of weaving; but when a plain looped fabric is produced, the figure or pattern is afterwards stamped or printed on the fabric. The production of figured carpets by this process is not new, nor is it new to stamp or print stocking or felted fabrics.

The improved fabric or carpet, produced according to the present invention, is made by the process of ingraining, or weaving together, uncolored warps and wefts, in what is termed "plys" (whether two or more plys be ingrained), and subsequently printing the figures in colors on either one or both surfaces of the cloth; that is to say, the cloth is woven plain, or without a colored pattern or figure, and thoroughly ingrained; no pattern, except that produced by the process of ingraining uncolored yarns, appearing on the cloth. This being done, the figure or design is next to be stamped or printed on the cloth, by means of blocks or cylinders, the number of which are in accordance with the number of colors required in the pattern or figure to be stamped or imprinted on the fabric. An ingrained printed carpet, so made, possesses many very important advantages, not only over the common ingrain carpets, whose figures are produced in the process of weaving the fabric, but also over other kinds of printed carpets or floor-cloths; for, in the first place, and particularly when three plys are used, it admits of a figure of one kind, and composed of any colors, being stamped or printed on one

side of it; while a figure of an entirely different kind, or one having entirely different colors, is stamped or printed on the opposite side, or face of it; for the plying or ingraining process produces, as it were, two or more layers of cloth, which are simply connected together at many points or spots. The manner in which the cloth is woven, that is to say, the plying of it, operates to prevent the colors imprinted on the external surface of one of the plys or layers from striking into, and entirely through, the other ply or layer, so as to appear on its outer surface; whereas, a printed figure or colors, when produced on one side of a felted cloth or fabric, will strike through, and shew on, the opposite side thereof, without more or less exhibiting the figure of the first side. Only one side of the cloth, in tapestry Brussels weaving, viz., that on which the pile is raised, can be printed, as the opposite side has no raised woollen warps, and exhibits the binding linen warps.

From the above it will be seen, that colors imprinted on a plyed carpet, or two or three-ply carpet, as the same is termed, will not strike from one ply into and through to such an extent as to materially injure the exterior surface of such other ply, or so as to prevent it from receiving the same or a different design in the same or different colors.

When three or more plys are used, the middle one, or those situated between the outside plys, may be made of any other material or materials that can be converted into yarns; and thus, should any colors be used for the figure of one side that might, by any possibility, be likely to run through the opposite or outer ply, the middle ply might be made of a material and woven in such a manner as would effectually prevent such striking through of the color to any practically injurious degree. The common process of plying and ingraining seems, however, to render such precaution unnecessary, as the colors do not appear to go entirely through the cloth to any injurious extent, even in a two-ply carpet.

An ingrained printed carpet can be made according to the present improvement, with many colors in its figure, and, generally speaking, at very little expense, in comparison to what such figure can be produced by the process of weaving and ingraining colored yarns in a loom; consequently more beautiful patterns of ingrained printed carpets can be brought into the market and afforded at a less cost to the consumer or buyer than that for which the ordinary woven ingrained carpets can be purchased and sold.

The improvement or improved manufacture of ingrained ply-printed carpeting, made with a printed figure on one side

or surface, and another on the same, or a different figure printed on the opposite side or surface, affords to the user the advantage of turning the carpet after it has been worn or injured on one side, and using the opposite side uppermost, and either with the same or an entirely different figure from the first, in accordance with the character of the figure on the two sides of the fabric; such a carpet, when made with different figures on its opposite sides, presenting an advantage beyond the ordinary ingrain carpet made by weaving different colored yarns, as the figure on one side of the latter kind of carpet is governed by and is generally a similar one to that of the other side. It may be said to be essentially like it in form, and differs in being of an opposite color.

In the improved carpet there may be a difference in both form and color in the patterns or figures on its opposite sides; thus producing varieties of patterns on its opposite sides, that cannot be effected in the ordinary process of weaving and ingraining plys with colored yarns of various colors.

The second branch of the invention relates to the manufacture of single-ply printed carpets, and may be described as follows:—In the manufacture of single-ply carpets and other fabrics it has hitherto been found impracticable to print upon more than one side of the stuff; the colors invariably passing through to the opposite side, disfiguring the fabric to an extent which precludes the printing upon the opposite side, either the same or any other figure. It has, however, been found that a single-ply carpet, of the peculiar character which will be hereafter described, may also be printed upon both sides, with the same or different figures; thereby producing an entirely "new article of manufacture," viz., a single-ply printed fabric, with a perfect figure upon each side. The inventor is also enabled, by making use of the fabric above mentioned, to print any desired figure upon one side of the carpet, while the other side remains entirely uncolored and undisfigured by the penetration of the coloring matter from the other side. Or, by making the ground of the carpet of any light color, over which heavier colors for the figure are laid, and by printing upon one side, a carpet figured upon one side is produced, and having a uniform light or red ground upon the other: and thus a variety of effects, never before accomplished in printed fabrics, is or may be attained. The process by which the improved carpet is produced may be described as follows:—A strong stout cotton or other twine is employed for the warp, which is stretched tightly in the

loom, so as just to yield sufficiently to allow the necessary motion of the harness: over this is then thrown uncolored woollen filling, where the carpet is to be printed on one or both sides; or the filling may be of some light color, over which the figure is printed in heavier colors. Or the fabric may be woven of uncolored filling, and printed upon one side, where a uniform white color is desired upon the other. The filling is "beat up" very hard over the stretched warps, and the latter are thus entirely concealed from view, while they serve to prevent the passage of the coloring matter from one side of the carpet to the other, and greatly increase the strength of the carpet. The fabric thus produced is then printed upon one or both sides, as above described, and a carpet is produced, having all the strength due to the heavy cotton warp, which is entirely concealed between two woollen surfaces, and all the beauty, upon both of its surfaces, due to the present improved methods of printing; while in body it is heavier, and must prove more durable than the ordinary two-ply or Brussels carpets,—its cost being far below that of either of these articles.

With regard to the manner in which the carpet is woven, preparatory to printing, the inventor remarks, that the advantages resulting from its use are many, independent of its great economy in comparison with any other woollen carpet of equal body and beauty. The heavy ground-warp is "beat up" much closer than can be accomplished in any other carpet,—giving unusual strength in the direction of the length, while the large amount of woollen filling beat in, imparts equal strength to the fabric across or transversely.

The patentee claims an ingrained plyed printed carpet, made by a combination of the processes of weaving in two or more plys, and ingraining the same, and subsequently printing the figure or figures on both sides of the same, as described; the discovery having been made, that the plying process prevents the colors printed on one ply from penetrating through to the other ply, so as practically to injure its other surface to an extent which renders it unfit for the reception of colors and use as a carpet, as hereinbefore stated. Secondly,—a single-ply carpet, woven as above described, and printed upon one or both sides in manner substantially as herein set forth.

To Moses Poole, *of Searle-street, Gent., for improvements in the elastic ribs, sticks, and fillets used in the manufacture of umbrellas and parasols, and various other articles, in substitution of whalebone and steel heretofore employed, —being a communication.*—[Sealed 27th November, 1852.]

This invention consists in making parts of umbrellas and parasols, also whips, sticks, and the elastic springs of corsets and other parts of dresses, and other articles, by employing a composition, consisting of India-rubber (and combined or not with other matters), and sulphur heated to a high degree of temperature, producing an elastic horn-like substance, which, being made into like forms or shapes to those heretofore made of whalebone or steel, may be employed in the class of manufactures mentioned.

The composition employed for making the several parts of the articles of manufacture above mentioned, consists of two parts, by weight, of India-rubber (caoutchouc) and one part, by weight, of sulphur; and, although foreign matters may be used in the compound, particularly in the sticks of umbrellas and parasols, and the handles of whips, where so much flexibility and elasticity are not required, yet it is believed that foreign matters employed in such compound, tend to reduce the elasticity which results from the use of India-rubber and sulphur alone. The matters are to be very intimately blended by masticating or kneading; and, when used for the sticks of umbrellas, parasols, or the handles of whips, the same may be solid or hollow; and, if hollow, they are most conveniently made from the compound rolled into a sheet and cemented into a tubular form, before subjecting the same to the process of heat to produce the change necessary for converting the compound into the elastic condition desired; or, if the sticks of umbrellas, parasols, and handles of whips, are intended to be solid, a sheet, of the desired thickness of the compound, may be first subjected to heat, and changed into the desired character of substance, which may then be cut into fillets of the desired length, and which may afterwards be cut or rasped into the desired cylindrical or tapering forms required.

In making the ribs of umbrellas and parasols, sheets of the composition are first rolled out and subjected to heat, to convert them into the hard elastic substances before mentioned; and narrow fillets are then to be cut off and shaped into the desired form for the intended strips, fillets, or ribs, and offering a greater or less substance and elastic force, according as

they are to be used in parasols, or for larger or smaller umbrellas, or other uses; and such ribs may be scraped and polished, according as it is desired to give more or less finish to such articles.

In making springs for corsets, dresses, or other articles, it is preferred to form the compound into sheets, of a thickness depending on the substance and strength desired to be given to the springs to be cut therefrom; and having subjected the sheets to the process of heat, they are converted into the desired hard elastic substance: the forms of the springs required are then to be cut and shaped as if whalebone were being used; and it should be stated, that in cases of "busks" and other shaped springs, whether for corsets, dresses, or other uses, where it is desired that the normal state of the spring should be other than flat, the sheets of the composition are to be cut before being subjected to heat, and the portion suitable for a spring or springs should then be placed between metal (or other surfaces which will transmit the heat) of the shape desired, so that the composition may be held to the desired form when undergoing the process of heat, to convert the compound into the hard and elastic state necessary to render it suitable for springs.

In order to obtain the best elastic property to the compound above mentioned, it is found that the articles, above described, should be subjected to heat for about six hours; such heat being raised slowly up to 230° Fahr., say, in about half an hour,—retaining that heat for about 1½ hours, and raising it gradually during the remainder of the six hours, up to 295 or 305°:—this heat may be applied in any convenient manner. It is found convenient, in thus subjecting sheets of the compound to heat, to place each of them between two sheets of iron or glass, and to immerse them in an oil bath and lard oil, which is found to be the best oil for this purpose. Sheets, thus prepared, may, when heated to about 210° Fahr., be rolled between smooth hard rollers, and by such means extended, when they may be shaped by pressing in dies; and, when desired, such dies may be engraved, and they will produce impressions on the materials.

The patentee claims the manufacture of elastic ribs, sticks, and fillets, used in the manufacture of umbrellas and parasols, and various other articles, (in substitution of whalebone and steel, heretofore employed) from hard and elastic substances, produced by combining India-rubber and sulphur, and subjecting the same to the requisite heat.

Scientific Notices.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

July 27th, 1853.

SAMUEL H. BLACKWELL, Esq.,—in the Chair.

The following paper, by Mr. C. William Siemens, of London, was read:—"*On an improved governor for steam-engines.*"

The governor of a steam-engine has for its function to administer the supply of steam to the working cylinder in the ratio of the changeable load against the piston,—the purpose of which is to obtain an uniform velocity in the engine. In imparting motion to manufacturing machinery, the greatest possible regularity is required; for a regular motion enables the manufacturer to work his machines at the highest speed consistent with safety; produces the largest quantity and a uniform quality of goods; saves in personal attendance upon the machines; and, lastly, increases the durability of the entire mechanism employed by preventing back-lashes and jerks.

The common (Watt's centrifugal) governor is notoriously imperfect in its action, being defective in principle in two respects.

1st—It cannot regulate, but only moderates the velocity of the engine: that is, it cannot prevent a permanent change in the velocity of the engine when a permanent change is made in the load upon the engine; and it can only moderate the extent of permanent change in velocity, because its influence upon the throttle-valve depends on a change in the angular position of its weighted levers or pendulums, which change can only be effected by a permanent increase or decrease of the engine's velocity.

2nd—It cannot commence to act upon the valve until after the engine has undergone already a considerable change in its velocity; for at the instant when a portion of the duty is thrown on or off, the weighted levers are still in a state of equilibrium, and it is only by an accumulation of the fault, that they acquire a power to overcome the friction of the valve. To check the effect of the loss of time before the governor begins to act on the engine, it then moves the valve to the opposite extreme; and a series of fluctuations will follow before the engine can recover a steady velocity.

The author, in pointing out these defects in Watt's governor, referred to a diagram which shewed the two extreme positions of the weighted levers when in regular work; the one to be at an angle of 25°, and the other at 35° from the axis. The corresponding extremes of velocity were inversely as $\sqrt{\cos. 25°}$ to

$\sqrt{\cos. 35^\circ}$, or as 905 to 952. The regular speed of the engine must, therefore, undergo a periodical change of $5\frac{1}{4}$ per cent., supposing the pendulums to be suspended from a point in the axis of rotation. But if, as is most frequently the case, they are suspended from points removed some distance laterally from the axis, the change of speed is nearly doubled. The fluctuations which follow a sudden change of load, will, however, far exceed those limits. Let it be imagined that the engine is working at its medium speed, and that the governor balls are revolving in equilibrium. Suppose a string to be tied between the two balls, of tensile strength equal to the resistance of the motion of the throttle valve. Let a portion of the load be thrown off the engine, and the velocity of its fly-wheel and of the governor balls will gradually increase; but no alteration in the angular position of the balls can take place until their increase of centrifugal force suffices to break the string. The velocity will at this moment be proportionate to a much higher position of the levers than the adjustment of the valve requires; they will, however, ascend into that position, and remain until the velocity of the engine has dropped sufficiently below its proper speed to accumulate acting power in the governor in the opposite direction.

In practice, the defects of the governor are ameliorated by personal attendance to the engine at the times when considerable changes in its load are expected to take place. In cotton and flour mills, for instance, the attendant on the engine is always forewarned of such changes by a bell, and effects the adjustment of the valve by hand.

Since the time of Watt, many attempts have been made to produce a more perfect governor. Amongst them the governor of Hick is the most remarkable,—the regulating power of which depends on the rapidly increasing resistance, at increasing speeds, of the atmospheric air against rotating wings.

The two wings of Mr. Hick's governor are mounted upon a heavy boss, containing a female screw, which is made to slide freely upon the threads of an upright male screw. Rotary motion being imparted to the latter by the engine, the wings will partake of the same until the resistance of the atmosphere against them equals the tendency of their entire weight to slide down upon the inclined threads of the screw. If the engine exceeds that velocity, the wings will rise and thereby shut the valve, and *vice versâ*.

It is apparent that it makes no difference to the speed of the wings, and consequently of the engine, whether the former are in a more or less elevated position; and it follows, therefore, that this governor is free from the first-named objection to Watt's governor. It partakes, however, of the second, inasmuch as the resistance of the atmosphere is generally in equilibrium with the weight upon the inclined planes of the screw; and before either the one or the other can preponderate sufficiently to overcome

the resistance of the throttle-valve, it is necessary for the engine to deviate sensibly from its regular speed.

The author then described another variety of Mr. Hick's governor, which is remarkable for its simplicity and sensitiveness, although evidently less powerful than the former. The wings in this case were made to revolve by the preponderance of one loose weight over another; the engine being constantly at work to raise the heavier weight. Either of the loose weights was connected to the throttle-valve spindle; so that the tendency of the heavier weight was to open the valve, while the engine was ever busy to close it.

Another form of Hick's governor was proposed a few years since, in which the wings themselves were shaped like portions of screws; and being free to slide upon straight keys on the driving-shaft, were required to balance their weight by rotating under water, and so constantly tended to screw themselves upwards in the water.

The pneumatic or cataract governors, are a distinct group, of which a great variety have been proposed from time to time. The earliest is the cataract of the Cornish engine, by Watt. Heinrick's bellows governor, Lariviere's and Pritchard's hydraulic governors, are other varieties, which can readily be described under one head, as they differ only in details. A pump is worked by the engine to force water or air below the weighted piston of a second cylinder or cataract, from whence it again escapes through a contracted aperture in a uniform stream. If the engine pumps more water than is discharged by that aperture, the weighted piston will rise and close the throttle-valve by means of a lever; if, on the other hand, it pumps less than the discharge amounts to, the weighted piston will sink and open the valve. Abstracting the differences in the height of water column above the discharge pipe, and the friction of piston, the hydraulic governor would be capable of effecting the complete adjustment of the valve. It may moreover be made sufficiently sensitive for ordinary purposes, by adopting a comparatively large supply pump. It is, however, very liable to derangement, owing to the valves and pistons employed, which, if they become leaky or stiff, will greatly affect the speed of the engine, and necessitate frequent re-adjustment of the discharge orifice, according to the judgment of the attendant.

The author next proceeded to describe his "chronometric governor," which is dissimilar in principle to any above referred to.

The chronometric governor originally consisted of two essential parts, namely, the chronometer, and the differential motion between the chronometer and the engine, by which the effect upon the valve was produced.

The differential motion was obtained by means of three bevil wheels, one of which was turned by the engine; the opposite one by the chronometer in the opposite direction, and the re-

maining one geared into both; and was at liberty not only to revolve upon its axis, but also to follow bodily the motion of either the first or second wheel, by changing its angular position, and thereby the position of the valve.

The chronometer is required to possess the following properties:—

1st.—To measure the time by a continuity of motion, unlike the vibrating pendulum, which, as it were, deals it out in periods of seconds or other units.

2ndly.—To possess considerable momentum, or instantaneous power to overcome resistance, in acting upon the valve.

3rdly.—To admit of great fluctuations in its maintaining power, without suffering its speed to alter; and—

4thly.—To derive its maintaining power from the engine, and yet be affected uniformly by the same, in a similar manner that a clock derives its maintaining power from a falling weight.

The first and second conditions are fulfilled by a heavy conical pendulum, which, if freely suspended by a universal joint, will complete one revolution in the time during which a vibrating pendulum of the same length would complete one double oscillation. The length of the conical pendulum must, however, be measured from the point of suspension perpendicularly to the plane in which its centre of momentum rotates.

This length varies with the angle of rotation; and with it the time of completing one revolution in the inverse ratio of the square root of the length, or of the cosine of the angle of rotation.

It would be practically impossible to regulate the slight maintaining power required, to such nicety that the pendulum would persist in a uniform angle; and, if restrained, its properties as a chronometer would be entirely sacrificed. A remedy, however, suggested itself, consisting in the application of a break, which was put into action by the pendulum at the moment when it reached its intended angular position; and, by absorbing the excess of maintaining power beyond what was sufficient to overcome the friction and resistance of the atmosphere, its tendency to assume a still higher position was removed. An undue depression of the pendulum was guarded against by having a greater maintaining power than would be absolutely necessary; the excess being continually absorbed hy the break.

The differential motion offered a facility for obtaining the maintaining power by simply attaching a weight to a horizontal arm upon the spindle of a throttle-valve: this weight, by its tendency to fall, pressed the moveable or differential wheel against the teeth of the upper and lower wheels, and exerted a constant power, tending to accelerate the pendulum; while the engine, by moving the remaining wheel in the opposite direction, produced the effect of constantly lifting the weight by a rod.

The chronometric governor, it will be perceived, fulfilled the two conditions which are essential to obtain the perfect and in-

stantaneous adjustment of the valve of an engine; namely, its speed was not in the least affected by the position of the valve (or the load upon the engine), and, in distinction from all other known governors, its action was simultaneous with the occurrence of a change in the load of the engine; its differential motion being indeed the most delicate test which could be applied to detect practically imperceptible irregularities in the speed of the engine. If a considerable portion of load were suddenly thrown off an engine, the fly-wheel would gradually acquire an increased velocity; but since only about $\frac{1}{50}$th of a revolution in the advance of the uniform motion would suffice to shut the valve entirely, the adjustment of the same was effected before a sensible fault could occur.

The delicacy, and more particularly the expense of the chronometric governor, have been serious impediments to its more general introduction; and it is with a view to remove these that a new arrangement of the governor was proposed. The differential motion of this governor is similar to that of the old arrangement,—it being only strengthened by the addition of a second differential wheel. The principal change is in the chronometer, which consists of a fly-wheel, in four segments, which are separately suspended from the lower bevil-wheel, and are closely surrounded by a cast-iron casing.

The weight on the valve spindle will, on the engine being started, accelerate the wheel, until the centrifugal force of its segments exceeds their gravity, and causes them to proceed outward. They will, at that instant, touch the cast-iron casing, and, revolving at considerable velocity, the friction will readily absorb the excess of maintaining weight applied.

The principal feature of this governor is its great power of action upon the valve, which renders it applicable to work variable expansion-valves, or the flood-gates of water-wheels, without intervening secondary mechanism. At the instant when a change of load occurs, the power is indeed only limited by the strength of its rods and levers; because no amount of resistance could suddenly alter the velocity of its segmental fly-wheel.

It has further been ascertained, by experiment, that this governor will permanently support a weight of 1½ cwt. on the horizontal lever of the throttle-valve. It possesses, moreover, the advantage of acting when placed in a slanting position; one having been placed, indeed, with its axis horizontally, instead of vertically, and still continuing to act well after several years' service: this governor is thus rendered applicable to marine engines. Its great power would also enable it to act upon the lever of Woodcroft's screw propeller, with variable pitch, which it would regulate so as to maintain the engine at a uniform speed, independently of the speed of the vessel.

In the application of this governor to engines, it is important to give it the sole and entire command over the admission of

steam. For this purpose the throttle-valve of the engine should be more perfect than those commonly applied. The connection between the governor and the valve should, moreover, be made as direct as possible, and the maintaining weight be attached to the lever immediately upon the valve spindle, in order to prevent loss of motion.

Several governors of the improved construction have been put up by Messrs. Hick and Son, of Bolton (one to an engine on their works), and have proved practically successful during a trial of nine months.

Mr. SIEMENS exhibited a working model of the improved chronometric governor, and explained its action: the drawing shewn was about the size of a governor suited to a 30-horse power engine, which would have a revolving weight of about 1 cwt.

In answer to an enquiry—whether any comparison had been observed of the breakage of threads that occurred in spinning machinery when the improved governor was used in place of the old one, shewing the comparative economy in manufacture produced by greater steadiness and uniformity of motion—Mr. Siemens replied, that the chief advantage was found to be in the increase of work done by the same machines; the nearly absolute uniformity of motion enabling them to be driven at a higher speed. With the ordinary governor, the fluctuation in speed could never be less than 5 per cent., and was practically considerably greater; and as the maximum speed had to be set at the limit allowed by the manufacture, the mean speed of the machines was consequently so much below; but the new governor allowed the maximum speed to be adopted constantly, as the motion was practically quite uniform, and no fluctuations were perceptible. There had been more experience of the results in flour mills, at present, than in cotton mills; and in those cases the new governor was found to do away with the constant attendance of spout-men, who are ordinarily required to regulate the speed of the stones by hand, according to the variations in the quantity of flour produced, depending on the speed; and the quality of the flour was found to be enhanced by the perfect uniformity practically attained in the speed. The quantity of work was very considerably increased by the certainty that the governor afforded of maintaining constantly the maximum speed required.

Mr. Mc Connell asked what was the time required for the correction of the velocity, when a large proportion of the load was suddenly thrown off,—such as three or four pair of stones in a flour mill?

Mr. Siemens said, the correction was almost instantaneous, even when the whole of the load was suddenly thrown off; as the engine could only make a very small portion of a revolution before the governor shut off the whole of the steam, if necessary. He might mention, in illustration, a case where he was trying experiments on the efficiency of the governor with Mr. Field and

other gentlemen; and the whole of the load of a 30-horse power engine was suddenly thrown off, and then put on again after some minutes; but Mr. Field, who was in the engine-house timeing the engine, did not perceive any change in its speed.

In answer to another enquiry, Mr. Siemens replied, that the new form of the governor was really as simple and not more expensive than Watt's governor for the same power of engine: the fourth differential wheel added very little to the expense, and removed the wear of the spindle, by balancing the pressure on both sides. The governor itself never varied its velocity; so that that there was no varying in the speed of the different parts, to cause unequal wear or strain, as was the case in the ordinary governor. The original form of the chronometric governor was more theoretically correct; but the small surface of the point of the spindle, to receive all the pressure, involved more care in oiling and keeping clean than could be depended upon from some of the rougher hands having the charge of engines; but in the cases were they were properly attended to, they had kept in perfect order during seven years' constant work—the spherical ball acquiring a fine polish. The present improved form of the governor was quite free from this difficulty: the friction segments were left entirely without oil, as the pressure was too small to cause injury from want of oil, and the use or absence of oil did not affect the correct action of the governor; so that no source of inaccuracy could arise from accidental want of attention.

Mr. Clift enquired the effect of wear on the rubbing surfaces of the friction ring;—whether they required renewal, and whether the wear affected the accuracy of adjustment of the governor?

Mr. Siemens explained, that the only rubbing surfaces were the ends of the four steel pins, one in each of the segments; which were slightly rounded at the ends, with springs behind them to allow for wear; but the wear was exceedingly small; even in those of the first kind, which had been seven years at work, it was quite inconsiderable.

The following paper, by Mr. R. S. Norris, of Warrington, was then read:—

"Improved railway joint chair."

The object of this paper was to describe a method which has been in use on a crowded part of the London and North-Western Railway for above eighteen months; during which time it has stood well, and is now being extensively used on the same line.

The plan is to cast a chair or coupling on the rails at the joints as they lie in the line, by means of chills and a portable cupola. The hot metal, flowing freely into the chill, is allowed to come in close contact with the rails; and, in cooling, contracts so as to grip the ends of the rails firmly together. The great object to be attained is the converting of the rail into a continuous

girder, which shall not deflect at the joint more than at any other part: every successive year's experience having forced the attention of engineers and others to this point, to attain which many plans have been tried with more or less success.

Whatever mode of joint is adopted, or whatever method of joining the ends of rails, it is necessary that a certain allowance should be made for the longitudinal motion caused by the expansion and contraction of the rail. This object is attained, wherever necessary, by putting the chills, previously heated, on the ends of the rails for a short time, until they become hot, when they are taken off and a thin wash of loam and blacking is laid upon the rail end, which instantly dries on; and when the melted iron is poured against it, absolute contact with the rail is prevented. Although provision is thus made for the expansive and contractile force of the rail, the cavity in the chair being parallel to the rail, clips it sufficiently tight to prevent any vertical or lateral motion of the rails. The amount of surface of contact between the rail and chair is about 100 square inches, or 50 square inches to each rail end.

This great surface prevents any perceptible wear taking place on the rail ends from the longitudinal motion of expansion; and as no motion can take place vertically or laterally, no shock can take place by the action of the wheels; so that the joint will remain good for years; which has been confirmed by practice, so far as it has gone.

The operation of casting is very simple, and is performed without hindering the passing of trains during the execution of the work.

The apparatus consists of chills and a portable cupola; and the process is as follows, when operating on a line already laid:—Each joint sleeper or block is first lowered by the plate-layers about three inches, so as to give room for the application of the chills; or is removed altogether for the time; and the old chair being taken off the joint, the chills—consisting of a bed-plate with two lips, one on each side, holding down the side chills which slide in the grooves—are applied. These are put to the rail and held together by the screw-clips; and form a mould for casting the chair. This operation is quickly performed; and the chill is then packed under, temporarily, with loose metal plates: the moment this is done, a train may pass over it without hindrance.

Two steel pins are then put in their places in the chills, and form, when in their places, the cores for the holes of holding-down spikes. The chill mould being thus fastened in its place, is ready for the melted metal, which is run into it until it is level with the top of the sides.

The chills are made to fit the rails by a projection at each end, which grips the rail firmly; and a little loam is applied on the outside, to prevent the hot metal making its way out of the chill mould.

After a lapse of about five minutes, the mould is taken off, which is done in an instant. The form of this chair is such as to make it a strong and rigid clip, closely fitting the two ends of the rail along its whole length. Chairs may, by this method, be cast of any form. When the chair is cold enough, the sleeper or block is replaced, and the chair is spiked to it.

The operation is the same in relaying new roads; only that the expense of lowering or removing the block or sleeper is saved.

The metal used up to the present time has consisted of old chairs, mixed with a little new iron. This is melted in a portable cupola, formed of a cylinder of sheet-iron, $\frac{1}{16}$th of an inch thick, 2 feet 3 inches in diameter, and 4 feet 6 inches high, and lined with fire-bricks and clay, 4 inches thick, in the usual manner.

The cupola weighs about 6 cwt., and is easily lifted by the workmen on to a plate-layer's lorry, and taken to the place required; when it is lifted off, and placed on a few sleepers laid on the slope of a cutting or embankment. When once so placed, it will serve for half a mile of road without moving again, as the metal is so hot as to permit of its being taken in a moulder's ladle on a lorry to the chills at a quarter of a mile on each side the cupola.

The cupola has a belt or air-chamber, into which passes the air from the fan; and it has four tuyeres, of two inches orifice, to admit the air to the fire. The fan consists of a chamber, 1 foot 10 inches inside diameter and 9 inches wide, and weighs about 3 cwt.; it is detached from the cupola by drawing out the nozzle from the entrance to the air-belt, and can then be lifted separately into its place. The fan is turned by hand-winches; or, when the operations are extensive, by a small steam-engine.

The yield of metal from so small a cupola is very great: as much as $3\frac{1}{2}$ tons have been run down in seven hours by two men turning the handles of the fan, and nearly $4\frac{1}{2}$ tons by the use of an engine in the same time.

A smaller cupola, weighing about 2 cwt., is used for repairs of the line.

A good fastening is made for middle chairs by taking out the wooden key from the common middle chair, and casting an iron one in its place. This is done by heaping dry sand round the chair, as it stands in its place, and then running metal into the cavity so formed, and leaving a lip projecting over the chair. Only a few of these have yet been put down, but they have stood the test of two years' working over without failure, and are still tight. In casting, the hot metal running into the chair expands it; and its contracting upon the cast key in cooling makes it tight.

It may be remarked, that the new chair occupies exactly the same position on the sleepers, and has the same fixing as the common joint chair; so that, in case of damage to the line from accident or slips, it can be repaired quickly, in the ordinary

manner, by using the old chairs and wood keys until the small cupola can be brought to bear.

Mr. Norris exhibited specimens of the chairs and the cast-iron mould, complete; also a specimen of one of the new joint chairs, from the North Union Railway, which had been laid down for eighteen months in a line of great traffic, where 500,000 wheels had passed over it during the time: the two rail ends were cut off, and remained fixed fast in the chair; and the surface of the joint was level and smooth; although the rail ends had been much indented at the time the chair was cast on, from the rails having been recently turned.

In answer to an enquiry of the Chairman, Mr. Norris replied, that five miles had been recently laid with these chairs near Rugby, and about a mile was previously laid near Crewe, and elsewhere: they had mostly been at work one and a half years.

Mr. Woodhouse said the recent trial of the chairs near Rugby had been made under his superintendence, and he had found the result highly satisfactory. It had been intended to relay that portion of the line during the present summer, but the new joint chairs had proved of such benefit, that they would probably give several years additional life to that road. He consequently recommended the adoption of the plan, on a considerable length, at other parts of the line, which was now in progress.

In reply to several questions, he further said, that the joints could not be felt at all with the new chairs;—there was no comparison of the ease in travelling over the old plan of joints. The average of the work done at Rugby was about one chair cast every four minutes, including the whole process of preparation.

Mr. Norris said that the labor of casting cost about sixpence per chair; and the cost was about a shilling per chair, including all expenses except the metal, which weighed about 50 lbs. The expense of casting was much diminished, as the men got more experienced in managing it. At first they could only cast 40 chairs per day, but the rapidity of casting increased with practice to 80 per day; and now 120 per day were cast by common plate-layers, who had never before had anything to do with melted iron.

Mr. Slate said he had seen the first of these chairs 1½ years since, and had then an unfavorable opinion of their standing in work, from the great contraction of the melted metal in cooling on the rigid rail; but it appeared that the wrought-iron rail was expanded by the heat of the melted metal sufficiently to make the chair safe by its contraction again in cooling. He thought the new chair made a very perfect coupling of the rail ends, and was a great improvement on fishings and other plans, which he could only regard as make-shifts; and though they had a very good effect, compared with the previous plan of having nothing to couple the rails together at the joints, they were still far removed

from perfection. The new chair might be said to be quite perfect, if it could be made quite fast on the rail, without allowing it to slide.

Mr. Norris observed, that only every third or fourth joint was made a slip-joint for expansion: he was aware what a great advantage it would be to have no slip-joints, and by no means maintained that to be impracticable: the expansion of the rails successively, by the heat of casting the chairs on, would perhaps elongate them sufficiently to make provision for the expansion from the highest temperature they would be afterwards exposed to, and the tension would then resist the contraction from cold.

Mr. May remarked, that Mr. Brunel had now many miles length of Barlow's rail on the South Wales Railway, all rivetted fast together, without any provision for expansion, and no difficulty was experienced in consequence. There was some misconception on this point, respecting the action of expansion; it was limited in amount of force, and, if opposed by a greater force, no amount of expansion or contraction could take place. Wrought-iron, raised in temperature 15°, was expanded $\frac{1}{10000}$th of its length, and exerted a force of one ton per square inch of section by the expansion; consequently, no expansion of the rails would take place if a resistance were opposed of one ton per square inch for each 15° rise of temperature. He thought it probable that Mr. Norris's plan ultimately would require to have no expansion-joints to perfect it, and, in many cases, he did not doubt that the plan would be found excellent. He suggested, that an experiment could readily be tried to ascertain the actual amount of expansion of the rails, by having a number of thin graduated wedges, to be dropped into the joints at the hottest part of the day and at night, to measure the amount of expansion over a considerable length of rail. It would probably be found to be very insignificant, as the ordinary chairs offer a considerable resistance to a longitudinal motion of the rail, by the hold of the keys on the rail, the chairs on the keys, and the ground on the sleepers; though, of course, the resistance in Barlow's rail was a different case, where the rail, chair, and sleeper were all one.

Mr. Woodhouse remarked, that in laying the rails, the men place small wooden or iron packing pieces, 1-16th of an inch thick between the rail ends at the joints, to make the ordinary allowance for expansion; and they always find that if these pieces are put in early in the day they become so tight in the middle of the day that they cannot be got out, but are quite loose in the cool of the evening.

The Chairman observed, there was no doubt the expansive action of the heat would always produce its full effect, either by compressing the iron of the rails, or producing some motion or distortion in their position.

Mr. Norris said, that cases had occurred of the road becoming hog-backed, rising with the sleepers, out of the ballast, from the

want of sufficient allowance for expansion; also, in curves, the rails and sleepers had been pushed bodily outwards in the ballast by the effect of expansion. The extreme change in this country from 80° or 90° variations of temperature, amounted to a yard per mile, and this yard length must be disposed of somewhere in each mile, either by sliding or tension, or else by bending upwards or laterally, if there was not less resistance to compression of the iron.

Mr. C. Cowper remarked, that the extreme change of temperature of 90° would cause a total strain on the iron of 6 tons per square inch, at one ton for 15°, which amounted to the very severe total force of 40 or 50 tons on the whole sectional area of the rail of 7 or 8 square inches, to overcome any supposed resistance.

Mr. May thought the change of temperature in the rails would be considerably less than that of the air, because they were partly buried in the ground, and must, therefore, follow the temperature of the surface of the earth, which fluctuated much less than that of the air.

Mr. Duclos remarked, that the expansion or contraction of the rails would only take place from the mean temperature to the maximum or minimum; and as the mean temperature of the air in this country was about 50°, and the maximum 90°, making a change in the air of 40°, the actual change in the rails, from the mean temperature, was probably less than 30°,—causing a strain of not more than 2 tons per inch expansion or contraction.

The Chairman observed, it was an important subject for consideration, whether the allowance for expansion could be entirely dispensed with; and the new chair appeared an important step in that direction, and might lead to doing away with longitudinal bearings.

Mr. Norris said, that his attention had been first directed to the subject of this chair about two years since, by the circumstance of a very extensive alteration having been in contemplation from the ordinary rail and cross sleepers to a bridge rail on longitudinal timbers,—the alteration being proposed entirely on the ground of obtaining a superior coupling of the joints with the longitudinal bearing, than the ordinary rail and chair. But he objected to the bridge rail and longitudinal timbers as more expensive; and the idea then occurred to him of running the melted metal into the chairs to fill them up solid, and make a rigid coupling of the joint; and this led him to cast the joint chairs solid upon the rails in their places, as the complete way of carrying out the object.

Mr. Woodhouse remarked, that the process of casting the chairs would be going on for some time near Weedon and Leighton, on the London and North-Western Railway, and he should be glad to shew it to any member who might wish to see the process.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Case in which a full Specification has been deposited.*]

1945. John Webster Cochran, of Gower-street, for improvements in machinery for crushing, grinding, and pulverizing stone, quartz, or other substances.—[*Dated August* 20*th.*]

[*Cases in which a Provisional Specification has been deposited.*]

727. Alexander Prince, of Trafalgar-square, for improvements in carriages,—being a communication.—[*Dated March* 26*th.*]

1219. George Underwood, of Stichill, Roxbourgh, for improvements in preparations from sulphate of iron, to be employed as medicines.—[*Dated May* 18*th.*]

1314. George Harriott, of Islingham, Frindsbury, Kent, for improvements in agricultural implements employed in crushing and rolling land, and in frames for the same.

1324. John Henry Johnson, of Lincoln's-inn-fields, for improvements in removing the gummy or glutinous matter from textile and other materials,—being a communication.

The above bear date May 28*th.*

1788. John Smeeton, of Limehouse, for improvements in the manufacture of tablets and dial-plates, applicable to shewing the distances of carriages travelling, barometers, compasses, and time-pieces.—[*Dated August* 1*st.*]

1804. William Henry Clarke, of Great Marlborough-street, for improvements in the manufacture of a composition resembling papier-maché and carton-pierre, and applicable to the same purposes to which papier-maché and carton-pierre are applied; parts of which invention may also be applied to the construction of ships and boats, and roofing,—being a communication. —[*Dated August* 2*nd.*]

1828. Joseph Lallemand, of Besançon, France, for the manufacture of paper from peat.—[*Dated August* 5*th.*]

1842. Henry Southan, of Gloucester, for improvements in ploughs. —[*Dated August* 6*th.*]

1855. William Baines, of Coverdale-terrace, near Birmingham, for improvements in railways.—[*Dated August* 9*th.*]

1857. George Parsons, of West Lambrook, for improvements in steam-engines and boilers.

1859. John George Taylor, of Glasgow, for improvements in desks, work-boxes, dressing-cases, tea-caddies, and similar articles, and in the arrangements and fittings thereof.

1862. Thomas McSweny, of America-square, London, for improvements in the construction of ships and vessels.

1863. Samuel Hall, of Chadwell-street, Pentonville, for improvements in furnaces.

1865. David Mushet, of Coleford, Gloucestershire, and Edwin Whele, of Shiffnal, for improvements in propelling steam-vessels or other vessels.

The above bear date August 10*th.*

1867. Joseph Bacon Finnemore, of Easy-row, Birmingham, and Edwin Daniel Chattaway, of Camden-street, Birmingham, for improvements in apparatus for ascertaining or registering the number of persons travelling by omnibusses or other vehicles, or who may have entered in or passed by, out of, or through any particular place, vehicles, or building, during any given period.

1869. Thomas Kelley Hall, of Crewe, for certain improvements in forge hammers.

1870. Richard Farmer Brand, of South-terrace, Willow-walk, Bermondsey, for certain improvements in fire-arms and ordnance.

1871. Henry Palfrey Stephenson, of Thurloe-place, West Brompton, for improvements in the construction of suspension bridges.

1873. John Dearman Dunnicliff, of Hyson-green, Nottingham, and John Woodhouse Bagley, of Radford, for improvements in the manufacture of lace fabrics.

1875. Thomas Frederick Newell, of Cloak-lane, Queen-street, Cheapside, for improvements in machinery for numbering the pages of books and documents,—being a communication.

1876. William Longmaid, of Beaumont-square, Mile-End, for improvements in the manufacture of manure.

1877. Hugh Lee Pattinson, of Scots' House, near West Boldon, Gateshead, for improvements in the recovery of sulphur from alkali waste.

The above bear date August 11*th.*

1878. Samuel Adams, of West Bromwich, for a new or improved apparatus for regulating the supply of water to steam and other boilers, applicable also to regulating the supply of liquids to vessels and reservoirs in general.

1879. Louis Van Caneghem, of Conduit-street, Regent-street, for improvements in fastening corsets by a mechanical busk.

1880. James Strong, of Smethwick, for improvements in furnaces for smelting iron-stones and ores.

1881. Thomas Turner and John Field Swinburn, both of Birmingham, for improvements in sights for rifles.

1882. Edward Lavender and Robert Lavender, both of Deptford, for an improved apparatus for preparing the materials employed in the manufacture of certain composition fire-lighters.

1883. Read Holliday, of Huddersfield, for improvements in lamps, and in lanterns used therewith.

1884. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of fuel,—being a communication.

1885. Richard Archibald Brooman, of Fleet-street, for certain

new compounds which may be employed for mouldings, frames, and many purposes to which wood, papier-maché, plaster, gutta-percha, and other like substances are applicable,—being a communication.

1886. Richard Archibald Brooman, of Fleet-street, for a method of obtaining impressions from dies and other engraved and figured surfaces, by stamping or pressure,—a communication.

1887. Richard Archibald Brooman, of Fleet-street, for a method of producing castings in malleable iron,—a communication.

1889. Thomas Allan, of Adelphi-terrace, Westminster, for improvements in electric conductors, and in the means of insulating electric conductors.

1890. William Littell Tizard, of Aldgate, for improvements in the construction of thermometers and other like indicators.

1891. William Aldred, of Manchester, Richard Fenton, of Prestwich, and William Crone, of Salford, for certain improvements in separating or recovering the wool from cotton and woollen or other similar mixed fabrics, whereby the wool is rendered capable of being again employed.

1892. Daniel Illel Picciotto, of Crosby-square, for improvements in weaving,—being a communication.

1893. Horatio Wareham, of Fenton, for certain improvements in inlaying or ornamenting earthenware vessels.

1894. Robert Smith Bartleet, of Redditch, for improvements in apparatus used in sewing.

The above bear date August 12th.

1895. Frederick Lipscombe, of the Strand, for improvements in evaporating.

1896. John Clegg Boond, of Manchester, for certain improvements in Jacquard apparatus.

1897. John Perkins, of Manchester, for improvements in the manufacture of oils.

1898. George Peel, of Manchester, and Robert Brownhill, of the same place, for improvements in air-pump buckets, and in valves for steam-engines and other purposes.

1899. Chandos Wren Hoskyns, of Wroxhall, for improvements in the application of steam to cultivation.

1901. John Gwynne, of Essex-wharf, Strand, and James Egleson Anderson Gwynne, of the same place, for improvements in the preparation or manufacture of fuel.

1902. John Gwynne, of Essex-wharf, Strand, and James Egleson Anderson Gwynne, of the same place, for improvements in the preparation of beet-root for the manufacture of sugar; which improvements are also applicable to the preparation of other vegetables.

1903. John Henry Johnson, of Lincoln's-inn-fields, for improvements in dyeing or coloring textile fabrics and materials, and in the machinery or apparatus connected therewith,—being a communication.

1904. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the manufacture or treatment of gutta-percha, and in the application thereof,—being a communication.

1905. Edward John Scott, of Glasgow, for improvements in the manufacture of boots and shoes.

1906. Hesketh Hughes, of Cottage-place, for an improved method of producing cut and fancy patterns in velvets, silks, and other textile fabrics.

The above bear date August 13*th.*

1907. Joseph Leon Talabot, of Paris, and John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of cast-steel.

1908. Alexander Dalgety, of Deptford, for improvements in rotatory steam-engines.

1909. George Edward Dering, of Lockleys, for improvements in electric telegraphs.

1910. Archibald Douglass, of Norwich, for improved machinery for stitching, back-stitching, and running.

The above bear date August 15*th.*

1911. Richard Archibald Brooman, of Fleet-street, for a method of, and machinery for, reducing wood and other vegetable fibres to pulp, applicable to the manufacture of paper, pasteboard, millboard, papier-maché, mouldings, and other like purposes,—being a communication.

1912. James Stewart, of St. Paul's-road, Camden-square, for improvements in piano-fortes.

1913. Benjamin Rankin, of College-street, Islington, for improvements in propelling vessels.

1914. Edward Finch, of Bridge Works, Chepstow, and Charles Lamport, of Workington, for improvements in the masts and rigging of ships.

1915. Joseph Martin, of Liverpool, for improvements in mills for grinding corn and other grain.

1916. John Atherton, of Preston, and James Abbott, of Accrington, for certain improvements in, and applicable to, machines for winding yarn or thread, called "winding machines," used in the manufacture of cotton and other fibrous substances.

1917. Peter Foxcroft, of Salford, for certain improvements in machinery or apparatus for doubling cotton and other fibrous materials.

1918. George Richardson, of the Eastern Counties' Railway, Shoreditch, for improvements in railway signals, and in the means of preventing accidents upon railways, and in the apparatus connected therewith.

1919. William Hunt, of Lee Brook Chemical Works, near Wednesbury, for certain improvements in manufacturing sulphuric acid.

1920. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improvements in the distillation and purification of rosin oil,—being a communication.

The above bear date August 16th.

1921. John Heritage, of Warwick, for an improvement in the manufacture of bricks, pipes, tiles, coping, and such other articles as are or may be moulded in clay.

1922. Samuel Perkes, of Walbrook, for improvements in the construction of cocks and such like articles,—a communication.

1924. Thomas Clark Ogden, and William Gibson, both of Manchester, for improvements in machinery or apparatus for preparing, doubling, and twisting cotton and other fibrous materials.

1925. Thomas Kirkwood, of Edinburgh, for improvements applicable to ventilation and other purposes.

1927. George Leedham Fuller, of St. Mary's-road, Peckham, for improvements in steam engines.

1928. Joseph Hart Mortimer, of Chester-place, Old Kent-road, for improvements in lamps.

The above bear date August 17th.

1929. Robert Clough, of Liverpool, for improvements in the construction of ships and other vessels.

1930. David Chalmers, of Manchester, for improvements in machinery or apparatus for cutting the pile of woven fabrics.

1931. David Harkes, of Mere, Cheshire, for improvements in machinery or apparatus for mowing, reaping, or other similar purposes.

1932. Alexis Pigé, of Greek-street, Soho, for improvements in locks and their keys,—being a communication.

1933. William Symes, of Pimlico, for an improved fruit cleaning machine.

1934. Jean Larmanjat, of Paris, for certain improvements in obtaining motive power.

1935. Peter Fairbairn, of Leeds, for certain improvements in heckling machines.

1936. William Curtain, of Retreat-place, Homerton, for improved machinery for printing textile fabrics, oil-cloths, leather, paper-hangings, and other similar fabrics or materials.

1937. William Cornelius, of Panton-street, Haymarket, for improvements in gilding porcelain, glass, and such like materials, —being a communication.

1938. Auguste Mathieu Meurice de Bergevin, of Paris, for improvements in the manufacture of coke, and in the apparatus connected therewith, and in treating the products obtained therefrom,—being a communication.

1939. Thomas Hughes, of Birmingham, for an improvement or improvements applicable to writing slates, pocket and memorandum books, and other such like articles.

The above bear date August 18th.

1940. Frederick William Alexander de Fabeck, of Portland-road, for the construction of viaducts, bridges, lintels, beams, girders, and other horizontal structures and supports.

1941. Alfred Lutwyche, of Birmingham, for an improved mode of manufacturing steel or other metallic pens.

1942. Charles Watt, of Selwood-place, Old Brompton, and Hugh Burgess, of Percy-street, Bedford-square, for improvements in disintegrating and pulping vegetable substances.

1943. George Heyes, of Bolton, for improvements in looms.

The above bear date August 19th.

1944. James Kimberley, of Birmingham, for an improvement or improvements in raising and lowering various kinds of window-blinds, and in opening and closing window and other curtains; applicable also to the raising and lowering, or winding and unwinding of maps and other sheets or articles, and to the closing of doors.

1946. Jean Baptiste Polaillon and François Maillard, both of Lyons, for improvements in the manufacture of starch.

1947. Robert Moore Sievier, of Louviers, France, for improved machinery for the manufacture of terry or cut-pile fabrics; parts of which are applicable to the weaving of other fabrics.

The above bear date August 20th.

1950. William Schmollinger, of Gracechurch-street, and Edward Grainger Smith, of Lambeth, for improvements in the means of converting reciprocating or rectilinear motion into rotatory motion.

1951. Samuel Lomas, of Manchester, for an improved silk cleaner.

1952. John Steven, of Edinburgh, for an improved axle-box for railway carriages and waggons.

1953. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in the manufacture of certain mineral oils and paraffine,—being a communication.

1954. Victor Emile Warmont, of Neuilly, for improvements in dyeing and ornamenting skins, fabrics, and other substances.

1955. Frederick Osbourn, of Albion-street, King's Cross, for improved machinery for cutting woven and other fabrics.

The above bear date August 22nd.

1956. Charles Cowper, of Southampton-buildings, for improvements in the permanent way of railways,—a communication.

1957. William Brown, of Glasgow, for an improved mode of obtaining volatile products from bituminous coals, and other bituminous substances.

1958. Moses Poole, of Avenue-road, Regent's-park, for improvements in crushing and pulverizing quartz and other substances,—being a communication.

1959. James Webster, of Leicester, for improvements in pressure guages.

1960. Thomas Charles Medwin, of the Blackfriars-road, for improvements in steam-engine boilers.

1961. William Rettie, of Aberdeen, for an improved construction of submarine lamp.

1963. John Whiteley, of Stapleford, Nottingham, for improvements in warp machinery for the manufacture of textile fabrics.

1964. William Mann, of Stepney, for improvements in the purification of gas, and in the treatment of the material used in such purification.

1965. William McLeish, of Battersea, for a machine for destroying weeds.

The above bear date August 23rd.

1966. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in fire-arms,—being a communication.

1967. Benjamin Hornbuckle Hine, Anthony John Mundella, and Thomas Thompson, all of Nottingham, for improvements in machinery for the manufacture of textile and looped fabrics.

1968. George Culverhouse, of English-street, Hull, for improvements in manufacturing compost or manure.

1969. Thomas Foster, of Manchester, for certain improvements in machinery or apparatus applicable to etching or engraving upon plain, cylindrical, or other surfaces.

1970. Thomas Hill, and Alexander Thomson, both of Glasgow, for improvements in the manufacture of pipes or hollow articles from plastic materials.

1971. George Pollard, of Watling-street, and George Mumby, of Hunter-street, Brunswick-square, for improvements in machinery or apparatus for the manufacture of envelopes.

1972. Alfred Augustus de Reginald Hely, of Cannon-row, for certain improvements applicable to shades or chimneys for lamps, gas, and other burners.

1973. Alfred Swonnell, of Kingston-on-Thames, for an improved construction of tie for neckcloths and neck-ribbons, applicable also to neck ribbons of caps and bonnets.

1974. Edward Heard, of Regent-street, Lambeth, for a certain mixture or composition of chemical agents for rendering sea-water fit for washing, and for softening hard water for similar purposes.

1975. Charles Collyford Banks, of Clapham, for improvements in lubricators.

The above bear date August 24th.

1976. Alfred Beck Tompson, of Richmond, for a new or improved spring-door hinge,—being a communication.

1977. William Austin, of Holywell-street, for improvements in the manufacture of blocks of plastic materials for building purposes.

1978. John Shaw, of Manchester, and Joseph Steinthal, of the same place, for an improved manufacture of artificial manure.

1979. George Davis, of London, for certain apparatus for distinguishing genuine from counterfeit coin.

1980. Richard Archibald Brooman, of Fleet-street, for machinery for digging, breaking, and trenching land,—a communication.

The above bear date August 25th.

1981. Richard Archibald Brooman, of Fleet-street, for improvements in the treatment of wool and silk, and in machinery for preparing silk so treated,—being a communication.

1982. Eugene de Varroc, of Great Chesterfield-street, for certain means of depriving caoutchouc of all unpleasant odour, and of imparting to it various agreeable perfumes.

1983. Robert Wilson, of Glasgow, for improvements in the treatment or finishing of textile fabrics.

1984. William Watson, jun., of Leeds, for improvements in apparatus for manufacturing prussiate of potash.

The above bear date August 26th.

1985. Richard Roberts, of Manchester, for improvements in the construction of casks and other vessels.

1986. Alexander Louis Bargnano, of New York, for improvements in the manufacture of paper and pasteboard.

1987. William Hargreaves, of Bradford, Yorkshire, for improvements in machinery for preparing and combing wool, hair, flax, silk, and other fibrous substances.

1988. Charles William Lancaster, of New Bond-street, for a method of, and machinery for, manufacturing or producing certain descriptions of gun and pistol barrels.

1989. James Hill, of Stalybridge, for certain improvements in machinery used for spinning, doubling, and winding cotton, wool, flax, silk, and other fibrous materials.

1990. Rodolphe Helbronner, of Spring-terrace, Vauxhall-walk, for a chemical light, and apparatus for manufacturing the same.

1991. John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.

1992. Henri Georges Collier, of Paris, for improvements in rotary pumps.

1994. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved construction of steam-hammer,—being a communication.

1995. George Robinson, of Newcastle-upon-Tyne, for the novel application of the slags or refuse matters obtained during the manufacture of metals.

1996. Edward Lacey, of Handsworth, and William Wilkinson, of Nottingham, for a new description of cloth or fabric, applicable to most purposes to which woven and knitted fabrics are applied.

1997. Josiah Hornblower, of Poplar, for improvements in machinery for steering vessels.

The above bear date August 27th.

1998. John Foss, of Aldgate, for improvements in printing apparatus.
1999. Adolph Berend, of Fenchurch-buildings, for improvements in instantaneous light apparatus,—being a communication.
2000. Joseph Cundy, of Victoria-road, Kensington, for improvements in kitchen ranges and cooking apparatus.
2001. Edward Patrick Gribbon, of Dublin, for improvements in window-frames and sashes.
2002. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in apparatus for heating,—a communication.
2003. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in the production of electricity,—being a communication.

The above bear date August 29th.

2005. John Bald, of Alloa, Clackmannan, North Britain, and Charles Maitland, of the same place, for improvements in distilling
2007. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in combining India-rubber with other matters for writing, marking, and drawing,—being partly a communication.
2008. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in rules, graduated scales, and measuring instruments.
2009. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in the manufacture and ornamenting or coating of articles when compouuds containing India-rubber are used.
2010. Joseph Cundy, of Victoria-road, Kensington, for improvements in gas-stoves.
2011. James Picciotto, of Crosby-square, for improvements in burning and reburning animal charcoal,—a communication.
2012. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved process of dyeing; part of which process is also applicable to bleaching,—being a communication.
2013. Willliam Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for cleaning bran or other offal obtained during the manufacture of flour,—being a communication.
2014. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for cleaning grain and seeds, —being a communication.

The above bear date August 30th.

2015. Ezra Washington Burrows, of Pentonville, for improvements in the construction of cranes and other machines for raising heavy bodies.
2016. Astley Paston Price, of Margate, for improvements in treating wash-waters containing soap, oils, saponified or saponifiable materials, and in obtaining products therefrom.

2017. Thomas Dawson, of King's Arms Yard, and Thomas Restell, of the Strand, for improvements in fishing rods.

2018. Grignon Meusnier, of Paris, for improvements in carriage clocks.

2019. Edward Smith, of Love-lane, for an improved mode of manufacturing carpets.

2020. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for reaping and gathering corn, grain, and other agricultural produce,—a communication.

2021. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for making barrels and other casks,—being a communication.

2022. William Beckett Johnson, of Manchester, for improvements in steam-engines, and in apparatus connected therewith.

2023. Henry Jeremiah Iliffe and James Newman, both of Birmingham, for improvements in the manufacture of buttons.

2024. John Phillips Grazebrook, of Audnam, near Stourbridge, for improvements in the working barrels of pumps; which improvements are also applicable to lining other metallic tubes.

2025. Richard Archibald Brooman, of Fleet-street, for an improvement in paddle-wheels,—being a communication.

The above bear date August 31st.

2026. John Macintosh, of Pall Mall, for improvements in breakwaters.

2027. Robert Oxland, of Plymouth, for improvements in the manufacture of manure.

The above bear date September 1st.

2028. John Hinks, George Wells, and Frederick Dowler, all of Birmingham, for new or improved machinery, to be used in the manufacture of metallic pens and penholders.

2029. John Tayler, of Manchester, James Griffiths, of Wolverhampton, and Thomas Lees, of Stockport, for certain improvements in steam-boilers, and in apparatus applicable thereto, and to be used therewith.

2030. Barthélemy Auric, of Grenelle, France, for the new application of sulphate of lime to the fabrication of the mosaics and incrustations, and for any new processes of coloration of certain varieties of this substance.

2031. James Pigott Pritchett, the younger, of the city of York, for improvements in window sashes and shutters.

2032. Augustino Carosio, of Genoa, for improvements in obtaining power by the aid of an electric current, for motive and telegraphic purposes.

2033. John Sibley and Thomas Sibley, of Ashton-under-Lyne, for improvements in machinery or apparatus for cutting discs or circles out of plates or sheets of metal or other substances.

2034. William Ashton, of Manchester, and William Brotherton Harvey, of Salford, for certain improvements in machinery or apparatus for manufacturing braid.

The above bear date September 2nd.

2035. John Thomas Jewiss, and Daniel Jewiss, both of Horsley-down, for an improvement in furnaces.
2036. Ebenezer Dobell, of Hastings, for improvements in clocks or time-keepers, and parts connected therewith.
2037. Thomas Walker, of Birmingham, for improvements in rotary engines to be worked by steam or other fluid.
2038. Albert Nagles, of Ghent, for certain improvements in machinery or apparatus for washing, bleaching, dunging, and dyeing woven fabrics.
2039. Gage Stickney, of Hanover-street, Pimlico, for an improved construction of blower,—being a communication.
2040. Gage Stickney, of Hanover-street, Pimlico, for improved machinery for forging metals,—being a communication.

The above bear date September 3rd.

2041. John Doyle, of Cambridge-street, Paddington, for the waterproofing of boots and shoes.
2043. John Smalley, of Bishopgate, Wigan, and Washington Smirk, of Ince, for an improvement in railway carriage axles.
2044. John Henry Johnson, of Lincoln's-Inn-fields, for improvements in the manufacture of stays or corsets,—being a communication.
2045. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for weaving terry fabrics,—being a communication.
2046. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in breech loading guns,—being a communication.

The above bear date September 5th.

2047. Thomas Bollmann Upfill, and William Brown, both of Birmingham, for an improvement or improvements applicable to metallic bedsteads, couches, chairs, and such other articles as are or may be used for sitting, lying, and reclining upon.
2048. Lemuel Wellman Wright, of Charlford, for improvements in reaping and gathering machines.
2049. André Calles, of Southwark-square, for improvements in manufacturing typographic characters.
2050. John Kerfoot, of Lower Darwen, for improvements in machinery for spinning cotton or other fibrous substances.
2051. Henry Wilkinson, of Tottenham-mews, for improvements in the construction of air furnaces; parts of which improvements are applicable to other furnaces.
2052. James Davis, of the Low Furness Iron Works, near Ulver-

stone, and Robert Ramsay, of the same place, for an improved engine to be worked by steam, air, or water.

2053. Thomas Pope and Edward Bufton, both of Birmingham, for improvements in buttons, and which improved buttons they propose to designate by the name of "buffalo buttons."

The above bear date September 6th.

2055. Isaac Smith and Alfred Somerville, both of Birmingham, for improvements in metallic pens and pen-holders.

2056. Joseph Alsop, of Huddersfield, and Edward Fairburn, of Mirfield, for improvements in baking bread.

2057. John Gaskin Fletcher, of Accrington, and William Peel, of the same place, for improvements in looms for weaving.

2058. David Law, of Glasgow, and John Inglis, of the same place, for improvements in moulding or shaping metals.

2059. William Joseph Smith, of Stretford, for certain improvements in buttons or other such fastenings, and in applying or affixing them to wearing apparel.

2060. Western Grimshaw, of Morsley, Ireland, and Ellis Rowland, of the same place, for improvements in the manufacture of bricks.

2061. George Edward Ashton, of Middlesex, for converting certain refuse materials into yarn, for the manufacture of woven and other fabrics.

2062. Benjamin Hustwayte, of Hockley-street, Homerton, and Richard John Paul Gibson, of Upper Brunswick-street, Hackney, for an improved composition or compositions applicable to the manufacture of bricks, tiles, and other moulded articles.

The above bear date September 7th.

2063. Simpson Goy Pape, of Gloucester-crescent, Camden-town, for brace-ends; being a new suspender for trousers, breeches, and drawers.

2064. James Gascoigne Lynde, jun., of Great George-street, for a pressure governor, or self-acting apparatus for regulating the flow of water.

2066. John Dickinson Brunton, of Truro, for an improved wind-guard or chimney-top.

2067. John Petrie, jun., of Rochdale, for improvements in cans or vessels used for applying oil or other lubricating material to machinery.

2068. James Coate, of Marylebone-street, Regent-street, for improvements in tooth, nail, and hair brushes.

2069. James Burrows, of the Haigh Foundry, near Wigan, for certain improvements in the formation or construction of rolled metallic plates.

2070. William Hall, of the Colliery, Castlecomer, for improvements in the conversion of peat into charcoal.

The above bear date September 8th.

2074. John Henry Johnson, of Lincoln's-Inn-fields, for an improved apparatus for facilitating the acquirement of the art of reading,—being a communication.
2076. Michael Leopold Parnell, of the Strand, for improvements in the construction of locks.
2078. John Doyle, of Cambridge-terrace, Paddington, for the better ventilation of field tents and marquees.
2080. Charles Askew, of Charles-street, Hampstead-road, for improvements in baths.
2082. Jonathan Amory, of Boston, United States of America, for improvements in furnaces.
2084. Henry Woodhead, of Kingston-upon-Hull, for improvements in spinning machinery.
2086. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of gas burner and gas regulator,—being a communication.

The above bear date September 9th.

New Patents.

Sealed under Patent Law Amendment Act, 1852-3.

819. James Roose, of Birmingham, for improvements in the manufacture of welded iron tubes.—November 22.
498. James Murphy, of Newport, for improvements in trucks, waggons, or vehicles for railway purposes.—February 28.
502. George Duncan, of Chelsea, for improvements in steam-boilers.—February 28.
503. Peter Armand Le Comte de Fontainemoreau, of South-street, Finsbury, for improvements in drying cigars,—being a communication.—February 28.
511. Edward Charlesworth, of York, for improvements in bill or letter holders.—March 1.
521. John Smith, of Upper Fountain-place, City-road, William Henry Smith, of the same place, and Alexander Williams, of Seething-lane, for certain improvements in metallic plates, and in producing devices or ornamental patterns thereon, and in the apparatus and machinery to be used for such purposes.—March 2.
526. Marcel Vetillart, of Le Mans, France, for improvements in drying yarns.—March 2.
545. Robert Craib Ross, of Edinburgh, for an improved machine or instrument for cutting files and forging metal.—March 4.
547. Joseph Sparkes Hall, of Regent-street, for improvements in cutting out parts of boots and shoes.—March 4.
550. Henry McEvoy, of Birmingham, for improvements in covered buttons.—March 4.

554. Mary Ann Smith, of Wimpole-street, for improvements in the manufacture of toys, models, and other like articles of ornament or utility.—March 5.

556. Baldwin Fulford Weatherdon, of Chancery-lane, and Charles Dealtry, of Guernsey, for improvements in the construction of certain floating vessels, and in the mode of propelling them.—March 5.

557. Thomas Wells Cross, of Hunslet, for a portable fire-engine.—March 5.

558. William Todd, of Rochdale, for improvements in steam-engines.—March 5.

560. Richard Archibald Brooman, of Fleet-street, for improvements in machinery for making pipes and tubes,—being a communication.—March 5.

563. William Barrington, of Mallow, for an improvement in life-boats.—March 7.

567. Jacques François Dupont de Bussac, of King's-road, Chelsea, for certain improvements in paving and covering places,—being a communication.—March 7.

569. William Matthews, of Nottingham, for improvements in piano-fortes.—March 7.

571. Thomas Weatherburn Dodds, of Rotherham, for improvements in the treatment and manufacture of iron and steel.—March 7.

572. Charles Parker, of Dundee, for improvements in weaving.—March 7.

574. Thomas Weatherburn Dodds, of Rotherham, for improvements in the manufacture of wheels and axles.—March 7.

577. John Hall and John Crofts, both of Birmingham, for an improvement or improvements in revolving or repeating fire-arms.—March 7.

583. Charles Baker, of Southampton, for improvements in moulds for the manufacture of bricks.—March 8.

588. James Veevers, of Littleborough, and Henry Ashworth, of the same place, for certain improvements in machinery or apparatus to be employed in the preparing of cotton and other fibrous materials for spinning.—March 8.

591. John James Alexander Maccarthy, of Howland-street, for improvements in gunnery and projectiles, with pouch for the latter, which are adapted for muskets, rifles, pistols, and heavy cannon for field-pieces or forts, batteries, ships of war, and other vessels.—March 8.

594. Samuel Blackwell, of Oxford-street, for an improved strap or band, for connecting together certain parts of harness and saddlery; applicable also to other purposes where straps or bands are used.—March 9.

595. Samuel Blackwell, of Oxford-street, for improvements in saddlery and harness.—March 9.

598. William Pidding, of the Strand, for improvements in the

treatment or manufacture of caoutchouc or gutta-percha, in fabrics obtainable therefrom, and in the machinery or apparatus employed therein.—March 9.

599. George Chambers, of Russia-row, Cheapside, for improved means of gathering cinders, and depositing ashes under fire-grates,—securing economy in fuel, and cleanliness of appearance.—March 9.

603. Henry Ransford, of Chelsea, for improvements in the manufacture of starch.—March 9.

606. Frederick William Campin, of the Strand, for an instrument for measuring the steerage-way of vessels, and the rapidity of currents of water and air, applicable to ventilating ships and railway carriages,—being a communication.—March 9.

617. James Summers, of West Cowes, for improvements in certain kinds of sails.—March 11.

621. William Muir, of Manchester, for improvements in machinery or apparatus for grinding edge-tools and other articles. —March 12.

624. Auguste Edouard Loradoux Bellford, of Castle-street, Holborn, for improvements in machinery for cutting standing crops and gathering the same into sheaves or bundles,—being a communication.—March 12.

625. Nicholas Auguste Eugène Millon and Leopold Mouren, of Algiers, for certain improvements in the treatment of corn and other grains, and more especially in all that concerns washing, drying, grinding, curing, and preserving them.—March 12.

626. Thomas Evans, the younger, of Tooley-street, for certain improvements in the construction of steam-boilers.—March 12.

634. William Edwards Staite, of Manchester, for improvements in apparatus for producing and applying current electricity; parts of which apparatus are applicable for obtaining and treating certain chemical products resulting from electrolytic action.—March 14.

640. William Stevenson, of Johnstone, for improvements in the treatment or manufacture of textile materials.—March 14.

641. William Bashall, jun., of Preston, Lancashire, for improvements in dressing, sizeing, and tape machines.—March 14.

642. William Morgan, of Spencer-street, Shoreditch, for the manufacture of a portable double-action folding chair.—March 15.

645. François Durand, of Paris, for an improved kind of loom.—March 15.

648. Ephraim Sabel, of Broad-street Buildings, for improvements in the construction of looking-glasses, and in the apparatus connected therewith,—being a communication.—March 15.

649. George Knight, of Birmingham, and John Heritage, of Warwick, for an improvement or improvements in drying bricks and such other articles as are or may be made of clay.—March 16.

652. William Malins, of Saville-row, for certain improvements in

the application of atmospheric propulsion upon railways.—March 16.

653. Henry Richardson Fanshawe, of Arthur-street, Old Kent-road, for improvements in fire-arms.—March 16.

665. Paul Cameron, of Glasgow, for improvements in marine and surveying compasses.—March 18.

669. Richard Archibald Brooman, of Fleet-street, for an improved machine for weighing or measuring and packing spices, drugs, coffee, and like matters,—being a communication.—March 18.

671. John Haskett, of Wigmore-street, for improvements in grinding-stones and whetstones, being a communication.—March 18.

680. John Eldridge, of Stanley-street, Pimlico, for an invention for washing woollen, linen, cotton, silken, hempen, skin, and flaxen materials and substances, and called the "rotary washing machine."—March 19.

682. Henry Bousquet, of Fenchurch-street, for improvements in the manufacture of manure.—March 19.

688. William Whitaker Collins, of Buckingham-street, for certain improvements in looms for weaving,—being a communication.—March 21.

696. John Stather, of Kingston-upon-Hull, for improvements in printing.—March 21.

699. Thomas Bouch, of Edinburgh, for improvements in signals.—March 22.

706. John Henry Park and Joseph Park, both of Preston, Lancashire, for improvements in water-closets and urinals.—March 22.

708. Bernard Boyle, of Raven-row, Mile End, for a centripetal flange.—March 22.

709. Hesketh Hughes and William Thomas Denham, both of Cottage-place, for improvements in piano-fortes, organs, seraphines, and other like musical instruments.—March 23.

710. William Mann Crosland, of Beaumont-street, for improvements in block-making machinery.—March 23.

716. Charles Victor Frederic de Roulet, of Paris, for certain improvements in the manufacture of piled figured fabrics, by alterations in, and additions to, looms for weaving; including also a warping machine, with a method of reading and arranging the colors or materials for the patterns of such figured fabrics.—March 24.

717. Henry Webster and Edward Dawson Stones, both of Sheffield, for improvements in the construction of gas-stoves.—March 24.

726. Robert Hazard, of Lincoln's-inn-fields, for a "podombroslontron," or an improved apparatus for either sponge or shower-bath, and all lavatory purposes.—March 26.

731. George Robb, of Glasgow, for improvements in the manufacture of sulphuric acid, alkalis, and their salts.—March 26.

733. George Oakes Asbury, of Birmingham, for an improvement or improvements in the manufacture of dowls used in joinery.—March 28.

744. Luke Smith, of Littleborough, and Matthew Smith, of Heywood, for improvements in machinery for weaving and printing.—March 29.

761. Louis Michel Lombard, of Paris, for improvements in obtaining motive power.—March 30.

773. George Hanson, of Huddersfield, and David Chadwick, of Salford, for improvements in apparatus for measuring gas, water, and other fluids; which improvements are also applicable for obtaining motive power.—March 31.

778. John Smedley, of Lea Mills, Matlock, for improvements in machinery or apparatus for opening, cleaning, blowing, or scutching animal wool, cotton, or other fibrous substances or materials.—April 1.

782. Robert Evans Peterson, of Tottenham-court-road, for an improved piston,—being a communication.—April 1.

803. Francis Steigewald, of Munich, for improvements in the manufacture of glass and porcelain.—April 4.

805. Francis Steigewald, of Munich, for improvements in heating furnaces.—April 4.

828. William Johnson, of Lincoln's-inn-fields, for improvements in the production of ornamental surfaces in glass, porcelain, metals, and similar materials,—a communication.—April 6.

846. William Moseley, of Cumberland-terrace, Regent's-park, for a new method of railway traction, to be called a pony railway.—April 8.

861. John Fuller Boake and John Reily, both of Dublin, for improvements in signal-posts for railways, and apparatus connected therewith.—April 9.

882. Eliza Cunnington, of Devizes, for improvements in the decoration of furniture panels and other surfaces.—April 12.

904. Joseph Adamson, of Leeds, for improvements in flushing apparatus and in water-closets.—April 14.

919. John Lewthwaite, of Halifax, for improvements in rollers or mountings for blinds, maps, and other like articles.—April 15.

927. Isaac Simpson, of Preston, Lancashire, for improvements in machinery for covering wire, silk, cotton, linen, wool, or any other flexible material, with wire, plate, silk, cotton, linen, wool, or any other flexible material.—April 16.

928. Henry Wilks, of Rotherham, for improvements in cocks.—April 16.

940. William Hale, of Swan-walk, Chelsea, for new kinds of fire-arms.—April 19.

946. Thomas Day, of Birmingham, for a certain improvement in the manufacture of boots and shoes, whereby great ease is secured to the wearer.—April 19.

956. Richard Archibald Brooman, of Fleet-street, for improve-

ments in reaping and gathering machinery,—a communication. —April 20.

978. Thomas Knowles, of Newton, Lancashire, for improvements in the machinery or apparatus for picking warps.—April 23.

979. Frederick John Wilson, of Cadogan-place, Chelsea, for an improved wheel-barrow.—April 23.

1009. Samuel Plimsoll, of Fullwood, Upper Hallam, Sheffield, for more thoroughly and effectually cleansing, extracting, and separating or fining ale, beer, porter, bitter beer, India pale ale, and other malt liquors, from the yeast, bottoms, barm, sediment, and other extraneous matters and impurities with which it may be in combination.—April 27.

1023. William Reid, of University-street, for improvements in apparatus for testing the insulation of electric telegraph wires. —April 27.

1117. James Egleson Anderson Gwynne, of Essex Wharf, Strand, for improvements in the treatment or manufacture of peat and other substances to be used as fuel.—May 6.

1139. Peter Wright, of Dudley, for improvements in the construction or manufacture of tew-irons.—May 9.

1150. William Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for sewing,—being a communication. —May 10.

1155. Jacob Brett, of Hanover-square, for improvements in electric telegraph apparatus, being partly a communication.— May 11.

1190. George Fitz James Russell, of Duke-street, Adelphi, for an apparatus for disengaging, lowering, and raising ships' boats.—May 14.

1273. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the construction of pipe and other junctions,—being a communication.—May 23.

1308. Alexander Keiller, of Dundee, for an improved machine for the manufacture of confections, including all kinds of comfits, known by the trade as pan goods.—May 27.

1310. William Henry Bentley, of Bedford, for improvements in locks and keys; parts of which are applicable to window-sashes and doors.—May 27.

1389. Anthony Bernhard Baron Von Rathen, of Wells-street, for improvements in the mode of, and in engines for, applying motive power.—June 6.

1403. George Tillett, of Kentish Town, for improvements in portable houses and buildings.—June 8.

1433. William David Paine, of Thomas-street, Stamford-street, and George Alfred Paine, of Clark's-mews, St. Marylebone, for an improvement in the construction of steam boilers, and in steam boiler furnaces.—June 13.

1451. Jules Dehau, of Paris, for improvements in the manufacture of yarn, and fabricating articles therefrom.—June 15.

1452. Jules Dehau, of Paris, for improvements in the manufacture of woven fabrics, yarn, cordage, ropes, paper, and pasteboard, by the application of a material not hitherto used in Great Britain for such purposes.—June 15.
1456. John Elliott, of Oak-lane, Limehouse, and John Brown, of the same place, for improved machinery for making rivets, spikes, and screw blanks.—June 15.
1472. Joseph Warren, of Maldon, for improvements in ploughs. —June 16.
1475. Christopher Waud, Edward Waud, and William Busfield, all of Bradford, Yorkshire, for improvements in preparing wool and other fibrous substances.—June 17.
1476. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in machinery for pulverizing and washing quartz or ore, and for amalgamating the gold contained therein,—being a communication.—June 17.
1480. James Hogg, Jun., of Nicholson-street, Edinburgh, for improvements in the application and combination of glass, porcelain, stoneware, earthenware, terra-cotta, composition in plaster, of the kind called scagliola, and majolica ware.—June 17.
1482. William Hall, of Aberdeen, for improvements in ship-building.—June 18.
1487. Jacques François Dupont de Bussac, of Upper Charlotte-street, for an improved mode of making with iodine and its compounds, in combination with substances containing extractive principles, various elementary combinations,—being a communication.—June 18.
1498. George Young, of Neath, for improvements in grinding wheat and other grain.—June 18.
1509. Richard Cornelius, of Old Town-street, Plymouth, for improvements in the construction of churns for producing butter. —June 20.
1520. John Leach, of Over Darwen, for improvements in looms, for weaving.—June 21.
1523. Francis Huckvale, of Choice-hill, near Chipping Norton, for improvements in hand-hoes.—June 22.
1524. William Geeves, of New Wharf-road, for improvements in the manufacture of bricks—June 22.
1535. Joseph Rock, jun., of Birmingham, for an improvement or improvements in spring or clasp-knives; applicable to such other articles as shut or close after the manner of clasp-knives. —June 24.
1537. George Sands Sidney, of Brixton-road, for improvements in jugs or vessels for containing liquids.—June 24.
1545. Henry Goodall, of Derby, for improved machinery or apparatus for grinding or levigating various substances.—June 24.
1549. John Emanuel Lightfoot, of Accrington, for an improvement in the manufacture of certain coloring matter to be used in dyeing and printing.—June 25.

1551. Alfred Sandoz, of Ponts, Switzerland, for an instrument or apparatus which he terms a solar watch,—being a communication.—June 25.

1553. Richard Archibald Brooman, of Fleet-street, for improvements in printing, or in producing designs and patterns on stuffs and fabrics,—being a communication.—June 25.

1554. William Fairclough, of Stockport, for certain improvements in looms for weaving.—June 25.

1557. George French, of Bandon, Ireland, for improvements in axles or axletrees.—June 27.

1563. John Henry Johnson, of Lincoln's-inn-fields, for improvements in turning over the leaves of books, music, and engravings, and in the apparatus for effecting the same,—being a communication.—June 28.

1566. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in the construction of furnaces,—being a communication.—June 29.

1567. John Patterson, of Beverley, Yorkshire, for improvements in machines for reaping and mowing corn, grass, and other crops.—June 29.

1568. Robert Moore Sievier, of Louviers, France, for improvements in the manufacture of piled fabrics, and in machinery for effecting the same.—June 29.

1570. George Arthur Biddell, of Ipswich, for improvements in apparatus for cutting vegetable and other substances.—June 29.

1589. John Jaques, the younger, of Hatton-garden, for improvements in the manufacture of chess-boards and chessmen.—July 2.

1602. Nathan Pollard, of Bowling, Yorkshire, for an improvement in machinery for drawing wool and other staple.—July 5.

1604. George Mackay, of Buckingham-street, Strand, for improvements in the manufacture of glass,—being a communication.—July 5.

1611. William Woods Cook, of Bolton, for improvements in the manufacture of woven or textile fabrics.—July 6.

1625. Louis Cornides, of Trafalgar-square, for improvements in treating certain ores and minerals, for the purpose of obtaining products therefrom.—July 8.

1630. Louis Brunier, of Norfolk-street, Strand, for improvements in obtaining power by compressed air.—July 8.

1631. Stephen Martin Saxby, of Brussels, for improvements in apparatus for lowering ships' boats, and for holding and letting go tackle.—July 8.

1632. Moses Poole, of the Avenue-road, Regent's-park, for improvements in the manufacture of printing rollers.—July 8.

1638. Henry Hoskyn Peppin, of New Bond-street, for an improved joint for umbrella and parasol sticks,—being a communication.—July 9.

1646. Peter Fairbairn, of Leeds, for improved machinery for heckling flax, hemp, China-grass, and other fibrous materials. —July 11.
1648. Fabian Wrede, of Stockholm, for improvements in gas and air engines.—July 11.
1649. Henry Brougham Hopwood, of St. George-street East, for improvements in ships' ports or scuttles.—July 11.
1662. Abraham Walker Craig, Daniel Foster, and Thomas Valentine, of Belfast, for improvements in preparing for weaving wet spun yarns of flax and tow.—July 13.
1677. John Yule, of Glasgow, for improvements in rotatory engines.—July 14.
1678. William Little, of the Strand, for improvements in the manufacture of lubricating matters.—July 14.
1685. Charles Liddell, of Abingdon-street, for improvements in moving boats on canals and rivers.—July 15.
1687. Henry Bessemer, of Old St. Pancras-road, for improvements in the process of refining and manufacturing sugar.—July 15.
1689. Henry Bessemer, of Old St. Pancras-road, for improvements in the manufacture and treatment of bastard sugar and other low saccharine products, such as are obtained from molasses and scums.—July 15.
1691. Henry Bessemer, of Old St. Pancras-road, for improvements in the manufacture and refining of sugar.—July 15.
1692. Isaac Taylor, of Stanford Rivers, Essex, for improvements in machinery for printing.—July 15.
1700. Jacques Rives, of Rue Motay, Paris, for improvements in trusses for the cure or alleviation of hernia.—July 16.
1701. Benjamin Burrows, of Leicester, for improvements in Jacquard apparatus.—July 16.
1703. Samuel Colt, of Spring-gardens, for improved machinery for boring metals,—being partly a communication.—July 16.
1708. Peter Armand Le Comte de Fontainemoreau, of South-street, for a new mode of equilibrating indefinitely the weight of atmospheres,—being a communication.—July 18.
1716. Moses Poole, of Avenue-road, Regent's-park, for improvements in gas regulators,—being a communication.—July 20.
1718. James Shield Norton, and Henry Jules Borie, of Union Works, New Park-street, Southwark, for improvements in the manufacture of tiles and stairs from plastic materials.—July 20.
1719. John Dent Goodman, of Birmingham, for improvements in lanterns.—July 20.
1721. Alexander Cochran, of Kirkton Bleach Works, Renfrew, for improvements in finishing muslin and other fabrics.—July 20.
1730. Alexander Isaac Austen, of Trinity-place, Wandsworth-road, for improvements in the apparatus used in the manufacture of mould candles.—July 22.

CELESTIAL PHENOMENA FOR OCTOBER, 1853.

D.	H.	M.	
1			Clock after the ☉ 10m. 23s.
	—		☽ rises 3h. 41m. M.
	—		☽ passes mer. 10h. 26m. M.
	—		☽ sets 5h. 35m. A.
2			Ecliptic conj. or ● new moon
	11	49	☿ in conj. with the ☽ diff. of dec. 3. 46. S
5			Clock after the ☉ 11m. 36s.
	—		☽ rises 9h. 16m. M.
	—		☽ pass mer. 2h. 9m. A.
	—		☽ sets 6h. 50m. A.
	2	53	♀ in conj. with the ☽ diff. of dec. 3. 12. S.
	4		☽ in Perigee
7	5	49	♃ in conj. with the ☽ diff. of dec. 0. 51. N.
	—		Occul. θ Ophiuchi, im. 5h. 49m. em. 6h. 37m.
	6	49	♃'s first sat. will em.
9	3	26	☽ in □ or first quarter.
10			Clock before the ☉ 13m. 0s.
	—		☽ rises 3h. 14m. A.
	—		☽ pass mer. 7h. 5m. A.
	—		☽ sets 11h. 0m. A.
	6	10	♃'s third sat. will im.
11	17	4	☿ in the ascending node.
13	21	56	Pallas in conj. with ♀ diff. of dec. 28. 59. N.
14			Occul. 30 Piscium, im. 7h. 45m. em. 8h. 55m.
			Occul. 33 Piscium, im. 9h. 55m. em. 11h. 1m.
15			Clock after the ☉ 14m. 11s.
	—		☽ rises 5h. 6m. A.
	—		☽ pass mer. 11h. 7m. A.
	—		☽ sets 4h. 9m. M.
	21	10	Ceres in conj. with ♀ diff. of dec. 2. 35. N.
16			Mercury, R. A., 14h. 6m. dec. 13. 22. S.
	—		Venus, R. A., 16h. 0m. dec. 22. 16. S.
	—		Mars, R. A., 9h. 6m. dec. 17. 59. N.
	—		Vesta, R. A., 9h. 41m. dec. 15. 59. N.
16			Juno, R. A., 10h. 24m. dec. 3. 54. N.
	—		Pallas, R. A., 15h. 52m. dec. 7h. 6. N.
	—		Ceres, R. A., 16h. 0m. dec. 19. 40. S.
	—		Jupiter, R. A., 17h. 19m. dec. 22. 56. S.
	—		Saturn, R. A., 3h. 47m. dec. 17. 39. N.
	—		Uranus, R. A., 2h. 36m. dec. 14. 49. N.
	—		Mercury pass mer. 0h. 27m.
	—		Venus pass mer. 2h. 20m.
	—		Mars pass mer. 19h. 25m.
	—		Jupiter pass mer. 3h. 39m.
	—		Saturn pass mer. 14h. 14m.
	—		Uranus pass mer. 12h. 54m.
17	0	31	Ecliptic oppo. or ○ full moon
	21	41	♅ in conj. with the ☽ diff. of dec. 2. 18. N.
	—		Occul. x Arietis, im. 11h. 2m. em. 12. 17.
	—		Occul. B.A.C. 755, Im. 12h. 22m. em. 12h. 56m.
19	14	34	♄ in conj. with the ☽ diff. of dec. 1. 22. S.
20			Clock after the ☉ 15m. 9s.
	—		☽ rises 6h. 36m. A.
	—		☽ pass mer. 2h. 1m. M.
	—		☽ sets 10h. 7m. M.
	4	22	♀ in Aphelion.
21	3	0	☽ in Apogee.
	21	0	☿ in Aphelion.
	—		Occul. 132 Tauri, im. 16h. 42m. em. 16h. 55m.
	—		Occul. ε Geminorum, im. 17h. 31m. em. 18h. 42m.
23	5	7	♃'s first sat. will em.
25			Clock after the ☉ 15m. 51s.
	—		☽ rises 10h. 43m. A.
	—		☽ passes mer. 6h. 7m. M.
	—		☽ sets 2h. 29m. A.
26	1	11	♂ in conj. with the ☽ diff. of dec. 3. 25. S.
30	5	28	♃'s second sat. will em.

J. LEWTHWAITE, Rotherhithe.

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No. CCLXIII.

RECENT PATENTS.

To Louis Guillaume Perreaux, *of Paris, in the Empire of France, engineer, for improvements in machinery or apparatus for testing and ascertaining the strength of yarn, thread, wire, strings, or fabrics.*—[Sealed 31st January, 1853.]

In carrying out this invention, the yarn, thread, wire, strings, or fabric to be tested, is submitted to a regular strain or tension until it breaks, by securing one end to a moveable pin or clamp, which is capable of being drawn back gradually by some convenient contrivance, and attaching the other end of the yarn or thread to a similar pin or clamp, which is connected with an indicating apparatus.

The machine consists of a rectangular frame, the inner sides of which form guides, wherein are placed two moveable cross-heads or traversers, for carrying the pins, hooks, or clamps above mentioned, or other contrivances, to which the thread, yarn, wire, string, or fabric, to be tested, is attached. One of these cross-heads is actuated by a screw-shaft, which passes through a screw-box or female screw on the under side of the cross-head, and has a winch-handle at one end, for turning the screw-shaft and drawing back the cross-head, so as to stretch the material to be tested. The other cross-head is also moveable on the guides, but is held back by a strong double elliptical spring, connected at one end to the cross-head and at the opposite end to the fixed part of the framing. From this explanation it will be evident that, upon drawing back the first or moveable cross-head, the material or fabric

to be tested will be submitted to very great tension, but that the elliptical springs at the back of the second cross-head will yield, to a given extent, to the strain. It will therefore only be necessary to connect these springs to an index and dial; and, by indicating on the dial the action of the springs, the strength of the fabric or material that has been tested or operated upon will at once be ascertained. On one side of the rectangular frame, and parallel with the line of draught, is a graduated scale, which marks the degree of elasticity of the material—so important for all fabrics, and especially for woollen cloth.

In order to prevent too great a shock when the material or fabric to be operated upon breaks, the back clamp is connected, by suitable gearing, to a fly-wheel, which, when the clamp returns, is set in motion, and thus deadens the shock to which the apparatus would be otherwise exposed.

In Plate X., fig. 1, is a plan view of the machine, with the index and dial-plate removed, in order that the parts beneath may be more clearly seen; fig. 2, is a longitudinal section of the same; and fig. 3, is an end elevation,—some of the parts being shewn in section. *a, a,* are upright standards, which support a rectangular frame *b, b,* in which are placed the cross-heads *c,* and *c**. On one side of the frame *b,* is placed an adjustable gauge, to measure the length of the material that is under operation, and the amount to which it has been stretched. The cross-head *c,* is provided underneath with a female screw *d,* through which works the long screw *e,* whereby the cross-head is moved backwards and forwards on the guides at the inner side of the rectangular frame *b, b,* when the screwed shaft *e,* is turned by the winch-handle *f.* The cross-head *c*,* is also mounted in the guides of the rectangular frame *b, b,* and has a limited motion therein. To the back part of this cross-head is connected the double elliptical spring *g, g,* the opposite end of which is secured to the horse-shoe shaped end of the fixed framing: the double elliptical spring *g,* works in a bridle-piece *h, h.* A pin *i,* which passes through a socket made in some convenient part of the framing, bears with one end against the side of the elliptical spring *g,* and is held in contact therewith by the sliding-bar *j,* which is kept against the other end of the pin *i,* by the force of the helical spring *k.* It will be seen, on referring to fig. 3, that the under side of the bar *j,* is furnished with rack-teeth, which gear into the teeth *l,* made on the upper end of a sector-rack *m*; and into this rack *m,* gears a pinion *n,* on the shaft *o.* On the boss of the pinion *n,* is a

ratchet-wheel *p*, which is driven by a click or pawl attached to one of the arms of a fly-wheel *q*, mounted loosely on the shaft or spindle *o*. The index-plate or dial *r*, is fixed on the top of the horse-shoe part of the frame. To the back part of the cross-head *c**, is attached a toothed rack *s*, which gears into and drives a pinion *t*, on the spindle of which the index-hand *u*, is mounted. The thread, wire, or other material to be tested, is secured in any convenient manner to the pins or clamps *v*, *v**, of the cross-heads *c*, and *c**, shewn in fig. 2, and in the detached view fig. 4.

In operating with this machine, the thread, cord, or wire is secured at both ends to the pins or clamps *v*, *v**, and the winch-handle *f*, is turned, to draw back the cross-head *c*. The thread, cord, or wire *w*, fig. 2, will thus be submitted to considerable strain and tension, which strain will cause the advance of the cross-head *c**, and give the elliptical springs *g*, which are attached to the back of the cross-head, a tendency to collapse or straighten. The forward motion of the cross-head will also, by means of the rack *s*, and pinion *t*, cause the index-hand *u*, to move round, until the thread gives way and breaks: the figure on the dial-plate, at which the index-hand points at that moment, will indicate the amount of strain to which the material has been subjected. In order to ascertain the degree to which the material has been stretched, the zero mark on the rule *x*, at the side of the frame, should be brought to the edge of the cross-head *c**, and the exact length of the material, when strained tight, but unstretched, should be first ascertained, and then a second observation should be made, in a similar manner, just before the breakage takes place; and the difference between the two observations will shew the amount to which the material has been stretched. It will be seen that the rule *x*, is moveable longitudinally, in order to keep it always opposite the centre of the cross-head. When the thread breaks, the elliptical spring *g*, is prevented, by the gearing connected with the fly-wheel, from suddenly returning to its normal condition. The strain upon the spring tends to straighten it, and allow the pin *i*, and rack-bar *j*, to move forward; but when the spring expands again it will force back the pin *i*, and rack-bar *j*, and, acting on the toothed gear, cause the fly-wheel to rotate. By this means anything like a shock is prevented from the sudden collapse of the spring.

The patentee claims the general arrangement of machinery herein shewn and described, or any modification thereof, in which the strength of materials is ascertained by means of

elliptical springs. Second,—preventing the shock, occasioned by the sudden breaking of the material under operation, from re-acting on and deranging the mechanism, by causing the spring to act upon an arrangement of gearing, whereby a fly-wheel or other counteracting agent may be set in motion, in order to absorb or modify the power exerted by the spring when suddenly relieved from a state of tension.

To John Paterson, *of Wood-street, in the City of London, manufacturer, for improvements in buckles or fastenings.*—[Sealed 8th October, 1852.]

This invention consists in forming a buckle or fastening by inserting a moveable or sliding bar, or two or more bars, within a frame, one of which is free to slide therein, while the others remain stationary.

In Plate XI., fig. 1, is a front view of one of the improved buckles. *a, b, c, d,* is a metal frame, the sides *c,* and *d,* of which are slotted out, so as to allow the moveable or sliding bar *e,* to rise up and down therein. One end of the brace is permanently attached to the top part of the frame at *a,* and the free end of the tab is introduced from the back of the buckle, between the sliding-bar and the top of the frame, and is then brought over the sliding-bar, and passed between it and the lower part of the frame; so that, as long as there is a strain on the tab, it will be held securely in its place; and the stronger the strain the tighter will be the hold. In order to lengthen or shorten the brace, the sliding-bar must be raised towards the top part of the frame, and more or less of the tab drawn through. Figs. 2, and 3, are respectively a front elevation and section of a brace buckle, with the fixed bar inserted within the frame, in addition to the moveable or sliding bar,—the action being the same as in the buckle shewn at fig. 1: instead, however, of the brace being permanently attached to the top of the frame, it is secured to the stationary bar. Fig. 4, is a back view and fig. 5, a section of a buckle, suitable for waistbands and belts. In this modification the sliding-bar moves to and fro in two caps *c, c,* rivetted to the back of the buckle, instead of slots being cut out in the sides of the frame. Fig. 6, is a front view, and fig. 7, a section of a buckle, in which the ends of the moveable bar are slotted out, so as to slide up and down in the two end bars of the buckle.

The patentee claims, Firstly,—the manufacturing of buckles

or fastenings, with a moveable or sliding-bar, in the manner hereinbefore exemplified and described. And, Secondly,—the manufacturing of buckles or fastenings, with two or more bars held in a frame; the one being free to move or slide, while the other bar or bars is or are stationary.

To JOHN STRINGFELLOW, *of Chard, in the county of Somerset, engineer, for improvements in galvanic batteries for medical and other purposes.*—[Sealed 2nd October, 1852.]

THIS invention is distinguished from former contrivances, for producing voltaic electricity to be worn on the person, by being a battery formed of small compound plates or bars, composed of any two simple or compound metals of suitable chemical qualities. These plates are permanently connected together, so as to form one system: the whole system, when required, is capable of being folded into two or more lengths and placed in a case, small enough to be carried in the pocket. The acid necessary to the action of the metallic plates is carried in contact with them, either by means of filtering paper or other bibulous substances, or a collection of fibres between the two metals, or by means of the capillary force which the metals themselves supply when the space left between them is sufficiently narrow. In the latter case the metals are prevented from touching each other by threads or paper interposed between them at intervals. The voltaic electricity, developed by the battery, is conveyed to any parts of the person by means of metallic wires covered with braid, and furnished with a metallic plate at the end of each. The whole may be conveniently worn on the person without exciting any remark by its appearance. These descriptions of batteries are applicable for other than medical or physiological purposes.

The patentee observes, that what is called a compound plate or bar, is here called a "voltaic or galvanic pair," or simply a "pair." Any number of such pairs combined, temporarily or permanently, in one system, is called a "battery." So much of a folded battery, in which the connection is permanent, as is contained between joint and joint, is called a "leaf."

In Plate X., figs. 1, 2, 3, and 4, represent the manner in which the voltaic pairs are constructed,—*a*, being a plate of amalgamated zinc of the form shewn at fig. 1; around

which a bibulous or fibrous material is wound, such as thread, silk, hair, small gut, asbestos, or any substances capable of insulating one metal from another. Figs. 2, 3, and 4, represent strips of copper or other metal, electo-negative to the metal plate *a*,—fig. 2, being formed of copper gauze; fig. 3, of a strip of copper, having two rows of slots punched out of the metal; and fig. 4, a similar strip, but pierced or perforated with a number of circular holes; each of which strips are bent round the zinc plates *a*, and the edges soldered together. Or, instead of using these strips, the voltaic pair is formed by winding lengths of flattened copper wire round the zinc plates in a spiral direction,—an insulating substance being placed between the two metals. *b*, *b*, are pieces of flattened wire, which are inserted beneath the negative metal, and soldered thereto, but insulated from the zinc bars, or positive metal, by pieces of varnished paper, gutta-percha, or other insulating material, interposed between them.

In order to construct a galvanic battery, two or any greater number of galvanic pairs are combined, and formed into a series by soldering the ends of one piece of flattened wire of one pair to the zinc plate of the next, as represented at fig. 5. These small galvanic pairs, when so combined in leaves, may be arranged in any number or series, so as to form a battery of intensity by uniting the poles of one leaf or battery and the dissimilar poles of the next in the series, by means of projecting tubes *c*, *c*, which are made hollow, for the purpose of inserting the connecting wires; and, in order to form a battery of quantity, the similar poles are connected throughout the series,—one of the tubes *c*, being soldered to the zinc plate, while another is attached to the copper or positive pole.

Fig. 6. is a plan view of a series of leaves, constructed in a similar manner to that shewn at fig. 5: instead, however, of having a rigid connection throughout, there is a hinged joint *d*, *d*, which admits of the battery being folded and inserted into a case, as shewn at fig. 7, so as to be carried with great facility. Strips of gutta-percha or other insulating medium are placed, at intervals, on some of the pairs in each leaf, in order to prevent the leaves of the battery, when folded or placed in juxta-position, from coming into metallic contact. It will be necessary to observe that, in the hinged joint, the hinges must be so arranged that one side or half of the hinge shall be in communication with the positive metal, while the other half is in connection with the opposite or negative metal (see fig. 6). The projecting tubes *c*, *c*, are placed in the opposite ends and poles of the series.

Fig. 8, represents another form of portable battery, in which the leaves are arranged in a manner similar to the leaves of a book; that is, they are hinged at the back: any number of such leaves may be so connected together. In order to excite the voltaic pairs, when required for use, a sponge, moistened with diluted acid, is drawn along their surface,—the intensity of the current generated depending upon the strength of the exciting acid. When it is desired to connect the plates in any galvanic series, a flexible metallic band or cord is employed, the ends of which terminate in a hook, snap, or other kind of fastening, according to the formation of the plates to be connected. These cords may be also employed for conveying the current from the battery to its intended application. In order to convey the electric current generated by the batteries, metallic snaps, similar to those used for connecting the ends of necklaces, are inserted into the projecting tubes *c*, *c*, to which flexible metallic bands or cords are attached, terminating, either in metallic discs or points, according to the uses for which the current is to be employed. These flexible metallic cords or bands are made in the following manner:—Thin strips of flattened wire, of any suitable or required length, are wound round threads of cotton, silk, or other suitable material; and a series of threads, so covered together, is afterwards twisted, so as to form a cord or band; after which, threads of silk, mohair, or other similar materials, are plaited or braided round the cords.

The patentee claims, Firstly,—the several combinations and arrangements of galvanic pairs permanently connected, so as to form a battery, as hereinbefore described and represented. And, Secondly,—the flexible metallic connecting-bands or cords hereinbefore described.

To William Joseph Curtis, *of Grafton-place, Euston-square, in the county of Middlesex, civil engineer, for the invention of certain improvements in the formation of tram-roads or railroads, and carriages that run thereon.*—[Sealed 27th November, 1852.]

The peculiarity of this invention consists in constructing a tram or rail road, which requires no flange either on the rail or wheel; it is likewise immaterial that the gauge should be exact,—a considerable variation in the gauge making no difference to the working of the carriages along it.

In countries where railroads of the ordinary construction

are used, this tramroad will be used to fill up the interstices or spaces within the main lines, or to be carried through those parts of the country which are too poor or inconsiderable to warrant the outlay required by the ordinary mode of constructing railroads: it will also be applicable to the common roads of the country and streets of cities and towns, as carriages will run as light upon this tramroad as upon an edge railway. But the greatest value of this tramroad will be in its application to the colonies, and in rough and thinly populated countries; in which case, the trams will be made of the timber of the country: then—after a country has been opened up, by means of this tramway, and its wealth and population have increased—by placing iron rails, in the ordinary way, upon the wooden trams, locomotives can be used, as in the ordinary railroad.

The mode of constructing the timber trams is to lay the trees, either the top end of one resting on the butt end of the other, or to lay them side by side. All that is necessary is, that the transverse levels should be adjusted as in ordinary railroads. It is immaterial that the trees should be straight, excepting on the surface side, in the case of iron trams being used. As they would be, in most cases, in connection with railroads, the trams or rails may be, like the ordinary rails, fixed on either cross longitudinal sleepers or bars of iron about two inches wide, or more or less, if found necessary, projecting about an inch above the surface; so that the wheel may run free of the ground when upon the tram. In the case of wooden trams, one to two inches will be found the best space for the tram to project above the surface.

The carriages to be used upon this tramroad may be made in the ordinary mode for carriages upon common roads, either as carts with two wheels, or as waggons or carriages for four wheels; but the wheels must be made as will be hereafter explained. The best mode of making the carriage is to place the pivot of the carriage for the fore-wheels about two feet or thirty inches behind the centre, so that the carriage may be dragged with equal facility either backwards or forwards; besides which, this arrangement will cause a train of carriages, upon this construction, to follow better round curves.

The wheels are made either as rollers, with gudgeons in them, or each wheel may be detached, as in ordinary carriages. The wheels or rollers are bevilled at each end, in order to facilitate their passing on or off the trams with facility. The carriages being worked by animal power, so long as the animal keeps the centre of the track the carriages will keep upon

the trams; but when the carriage is required to be dragged off the tram, the animal will be guided off it, and the carriage will thus be as easily dragged on and off the rail or trams, as carriages are dragged on and off the common granite trams in general use.

The trams or rails forming the railway may be made out of the rough trees of the forest, as shewn in figs. 1 and 2, Plate XI., in which fig. 1, is a side elevation, and fig. 2, a cross section. In this instance, the smaller end of one tree rests upon the butt end of the one before it,—the butt being notched down to receive it: the trees are buried or sunk in the ground, leaving about 1½ inches of the upper side above the ground, and the knobs or irregular parts being taken off with the adze or other tool, or a slab cut off, so as to make the upper surface straight. It is of no consequence if the trees are crooked sideways, as the broad wheels or rollers, to be hereafter described, must be wide enough to compensate for such irregularity. Sometimes the trees may be laid side by side, as shewn in cross section and end view at fig. 3, and in plan view at fig. 4,—the trees breaking joint as shewn at fig. 4. The irregular dotted lines are intended to denote the irregular trunks of the trees,—the upper side being made straight, as before explained. Flat planks, scantling, round poles, or small trees, may also be used for temporary purposes, such as for getting off a crop from soft land, for getting timber out of forests, or other purposes; in which case, the timber is simply laid upon the ground: and, in some cases, a stake or peg is driven into the ground by the side of the timber, to keep it in its place whilst the load passes over it. Where small trees are used as a permanent railway, it may be necessary to supply cross sleepers; and in such case, the better mode will be to notch out the butt or larger end of the rough sleeper, as shewn in fig. 5, and to lay the sleepers the large and small ends alternately. The trams will be thus perfectly sustained, both vertically and horizontally. Sometimes it may be desirable to form the trams of scantling, as shewn, in side view, at fig. 6. The best way to form the joint, in all the instances in which the timbers are buried or sunk in the ground, will be by an union joint; and, if no iron rail be used, the surface is kept about 1½ inches above the ground. Iron rails are likewise used, which may be the same as those usually employed in ordinary railways, as is shewn in fig. 7,—A^1, being the sleeper, and *a*, the rail, which may be as shewn, or a flat bar, bevilled off at the edges, or other suitable shape. *b*, is a partial section of the periphery of a wheel,

shewing the manner in which the bevilled edge of the wheel takes the rail: the horizontal dotted line denotes the position of a wheel when running on the rail. When a flat rail, with a bevilled edge, is used, the bevilled edge of the wheel may be reduced in breadth: the upper surface of the iron rail may be an inch, more or less, above the surface of the ground.

The carriages adapted for the railway may be of any suitable form, like those in use on common roads, but having broad wheels, with the edges bevilled off, as shewn in fig. 2. If the rails are laid down accurately, the parallel part of the wheel may be about 9 inches wide, and the bevilled parts about 3 inches; but, if the trams are of timber, and not accurately laid down, the parallel parts of the wheels must be wider, so as to be within the range of the greatest irregularity of the trams. Fig. 3, is an end view of a cart or waggon, adapted for getting out timber from forests, as in cases where the timber is very irregular, or in other cases. This will be very useful in new countries, where the rollers may be made out of the trunk of a tree,—two iron gudgeons being inserted in the rollers, forming bearings like ordinary railway wheels. The ends of the roller are bevilled off, as shewn, for the same purpose as the wheels before described. The rollers may be used either for carts or waggons. *a*, is the tram or rail; *b*, the wheels or rollers; *c*, a cart; *d, d*, the spikes used to fasten the rails to the trams or sleepers; and A^1, the longitudinal sleeper for the iron rails *a*.

The patentee claims, Firstly,—the wide wheels, bevilled or not at the edge, without a flange, running upon rails or trams without a flange,—the surface of the rails or trams being raised above the level of the ground. Secondly,—the use of wide rollers with gudgeons, as shewn and described, running upon iron rails, or trams formed out of round or rough timber, as scantling buried in the ground, as described and shewn in figs. 1, 2, 3, 4, 5, and 6. Thirdly,—the combination of broad wheels or rollers, and railway, when the rails or trams are laid upon the ground, as described and shewn in fig. 4.

To HENRY POOLEY, *of Liverpool, ironfounder, for improvements in weighing-machines,—being partly a communication.*—[Sealed 9th February, 1853.]

THIS invention relates, firstly, to a mode of detaching from and re-connecting with the steelyard the levers and platform which support the load to be weighed. The object of this

part of the invention is to relieve the knife-edged centres and other delicate parts from unnecessary wear when the machine is not in use.

In Plate XI., fig. 1, is a side elevation of the machine complete, and fig. 2, is a vertical section, taken through the upper part of the standard, and from which the steelyard is suspended. Pendent from a knife-edged bar *c*, (figs. 2, and 3,) forming the point of impact of the steelyard, is a loop or ring *q*, which, when the apparatus is in use, takes on to a hook *p**, projecting from the edge of a tumbler *p*; which tumbler constitutes a part of the rod *j*, (commonly called the suspension-rod), and which connects the levers of the platform below with the steelyard above. This tumbler *p*, is slotted to receive a pin *d*, on which it slides very loosely; and which pin *d*, serves not only to keep the tumbler in an upright position with the rod *j*, but also prevents the tumbler from falling too far from the rod in either direction. Above the tumbler of the suspension-rod *j*, there is a hooked finger *k*, which, at certain times, rests in, and is suspended from, a loop or ring *m*, that hangs from the short end of a cranked hand-lever *l*, whose fulcrum is attached to the pillar *a*, of the machine, which also carries the steelyard *b*, and its appendages. That portion of the last-mentioned loop *m*, which is in immediate contact with the hand-lever *l*, has a projection or tongue on its upper end; which tongue is received within a spiral spring *n*, fixed to the inside of the cap or cover of the pillar *a*.

In order to detach or ungear the platform A, and its levers from the steelyard, the hand-lever *l*, must be first drawn down; by which operation the loop *m*, hanging from the shorter end of this lever, takes hold of the hooked finger *k*, at the top of the suspension-rod *j*, and raises that rod, with its tumbler *p*, (as shewn by dots in fig. 2,) and detaches it from the loop *q*, pendent from the point of impact on the steelyard; which latter loop *q*, then detaches itself and falls forward out of the vertical position which it retained whilst it was connected with, and hooked on to, the tumbler *p*. The hand-lever *l*, is then allowed to rise, and, consequently, the principal levers and platform are lowered down upon the solid resting bed, prepared in the box or frame within which the levers are fixed.

The operation of gearing or re-connecting the steelyard and levers is performed in the following manner:—In the operation of lowering the platform and levers, by means of the hand-lever *l*, and suspension-rod *j*, the back of the tumbler *p*,

presses against a part of the interior of the pillar *a*, which throws the tumbler forward. In order to put the several parts in gear, the hand-lever *l*, is first drawn down, which brings up the tumbler *p*, into contact with the loop *q*, that is pendent from the point of impact of the steelyard; and this loop, by its own weight, and its peculiar manner of hanging, falls back under the hook *p**, projecting from the edge of the tumbler; then the hand-lever being allowed to rise, the spiral spring *n*, by acting upon the top of the loop which hangs from the end of the shorter arm of that lever, causes it to drop clear of the hooked finger *k*, at the upper end of the suspension-rod *j*, and leaves the machine in free action.

The second feature of this invention is a method of regulating the amount of acceleration proper to compound lever weighing-machines. This improvement is shewn in the detached sectional views, figs. 3, and 4, which represent longitudinal and vertical sections of this part of the steelyard. The improvement is effected by the use and application of a weight *u*. This weight is secured in its position by means of a screw and nut *w*, capable of vertical movement, for the purposes of adjustment. It is placed inside the part *v*, of the steelyard or beam, and may be contained within the same chamber which holds the concealed counterbalance, patented by the present inventor, June 16th, 1847. By raising or depressing this acceleration-weight *u*, above or below the line of the centre of gravity of the steelyard, by merely loosening the screw-nut *w*, the action of the balance may be accelerated or retarded; or the steelyard may have a vibratory action, as circumstances may require.

The third feature of the invention consists in providing the knife-edged centres of weighing-machines and scale-beams with lateral knife-edged shoulders of a peculiar kind, which give proper bearings for the sides of links or suspending pieces, and so prevent all avoidable friction in those parts. These lateral antifriction knife-edges are shewn at *r*, *r*, figs. 5, and 6, which represent two views of the end of one of the levers. These edges *r*, *r*, which are made of steel or other metal of the required form, are shewn detached, and upon an enlarged scale, at figs. 7. They are fitted into prepared beds within the levers, beams, or steelyards *s*, and will fall out of their places, when required, by backing out the knife-edged bars or pieces *t*, to which they are designed to be guards and additions.

The patentee claims, First,—the means shewn and described, or any mere modification thereof, for detaching or

disconnecting the steelyard from the platform and its levers below, and attaching or re-connecting the same, when required, by means of pendent hooks or links, which may be connected or disconnected by means of a hand-lever or other suitable contrivance. Secondly,—regulating the acceleration proper for compound lever weighing-machines, by means of an adjustable weight. Thirdly,—the use and application of separate or removeable lateral knife-edges, for the purpose of diminishing the friction of the working parts.

To JOHN WHITEHOUSE, the Elder, *and* JOHN WHITEHOUSE, the Younger, *of Birmingham, brass-founders, for certain improvements in the manufacture of knobs for doors and other like uses; part of which improvements is applicable to the manufacture of certain articles of earthenware.*—[Sealed 5th February, 1853.]

THIS invention relates, firstly, to the manufacture of knobs from pulverized earthy materials instead of plastic clay, whereby a superior class of articles may be produced. This part of the invention is also applicable to the manufacture of basins, cups, pipes, handles, artists' color-pans, paste or patch-boxes, and numerous other articles usually made by potters with plastic materials.

By the present invention a much larger class of articles can be made by the dry process of pottery than it has hitherto been practicable to make, owing to the necessity which was supposed to exist of limiting the process to articles possessing a uniform thickness, or nearly so, as buttons, tiles, and such articles as could be removed from the mould, in which they were pressed, by simply raising the under surface of the die.

In making articles of powdered clay, with a raised embossed pattern on their face, it has hitherto been the practice to form corresponding indentations in the back of the articles, so as to render them of a uniform thickness throughout, in order that every part might undergo equal pressure, or as nearly so, as possible. This supposed necessity has arisen from the fact, that if a die, with a sunk pattern, were used in conjunction with a flat die, the parts of the articles, corresponding with the raised surface of the die, would be hard, while the other parts, which are thicker, and should have been supplied with a proportionate additional quantity of powder, will be soft; owing to the deficiency in the amount of pressure applied to the thin parts.

The improved dies or tools used by the patentees are so arranged and constructed that the parts of the die intended to make the thinnest portion of the article shall either recede from or descend below the other parts of the surface of the die, according to whether a raised or sunken surface is required; by which means any additional quantity of powder can be supplied, and the hardness of the article made uniform throughout; as a nearly uniform pressure can be applied to all parts of the article.

For the manufacture of knobs, the dies must be made in parts or segments; and, by the employment of such dies or moulds, such articles as cups, basons, pipes, handles, knobs, and other articles of earthenware or porcelain, which it has hitherto been impossible to make by the dry process, may be produced. The advantage resulting from the use of such divided or segmental dies is, that when the article has been made therein by compression, the several parts of the die can be taken asunder, and the compressed article removed therefrom with facility.

In Plate XI., fig. 1, is a plan view of a mould for making an artist's color-pan; fig. 2, is a longitudinal vertical section of the same; and fig. 3, is a transverse vertical section. *a, a*, is the bed-plate of the press; and *b, b*, is the mould-box, in which the die *c, c, c*, is placed. The box *b, b*, is firmly secured to the bed-plate by clamps, bolts, and nuts, or in any other convenient manner. The die *c, c*, rests on a moveable plate *d, d*, placed at the bottom of the box, and provided, at its under side, with a rod, whereby it may be moved up and down vertically in the box *b, b*, when required. The die *c*, is further provided with the moveable parts *f, f, f, f*, which can be raised in their holes or sockets in the die, as shewn at fig. 3, and by dots at fig. 2. The piston *g*, of a fly-press, or other pressing apparatus, works in the mould-box, as shewn, and compresses the pulverized materials therein.

The operation of making an article in this improved mould or die may be described as follows:—The moveable parts *f, f*, of the die *c*, are raised up in their sockets, as shewn at fig. 3, and the mould-box is then filled with the pulverized material. Fig. 2, represents the pressing piston down, and the color-pan formed. It will be seen that the parts 1, are about half the thickness of the parts 2, 2; consequently they will require only half the quantity of material. It is for this reason, therefore, that the moveable parts *f, f*, of the die *c*, are raised, as shewn at fig. 3, in which it will be seen that the parts 1, 1, have only about half the quantity of material of the parts 2, 2; there-

fore, when the piston *g*, descends, the parts *f*, *f*, will descend in their sockets, and the whole of the pulverized material will be submitted to one uniform pressure, or nearly so. The article having been made, the piston *g*, is withdrawn from the mould, and the die *c*, *c*, pushed up by raising the plate *d*, by means of the rod *e*, when the color-pan, or other article, may be taken away.

Fig. 4, is a transverse section of a mould and die for making patch-boxes. *a*, *a*, is the fixed foundation-plate; *b*, *b*, the mould-box; *c*, *c*, the die; and *d*, *d*, an annular block which supports the die, and is capable of being moved up and down in the mould-box by the rods *e*, *e*. The inside of the patch-box is formed by a moveable block or piston *f*, *f*, which answers the purpose of the parts *f*, *f*, in the former figures, and is capable of being moved up by the rod *f**; *g*, is the piston, whereby the pulverized earthy material is compressed. The box having been made, it is removed from the die and mould by first drawing back the piston *g*, and taking off the upper part *b**, of the mould-box: the annular block is then raised by means of the rods *e*, *e*, which lift the upper end of the box above the edge of the mould-box. By pushing up the piston *f*, by means of its rod *f**, the box will be forced out of the die, and can then be taken away. To facilitate this object it has been found convenient to construct the die *c*, of two or more parts, which may be taken asunder, as will be hereafter explained.

In making small articles, several dies are combined together in one plate, as shewn at figs. 5, 6, and 7. Fig. 5, is a longitudinal section of a number of dies combined together, for the purpose of making rings, roses, pateries, escutcheons, buttons, or other similar small articles. *a*, *a*, is the foundation-plate, as before; and *b*, *b*, is the mould-plate, which is placed upon another plate *d*, *d*, shewn in plan at fig. 6. This plate *d*, is capable of being moved up and down by means of the rod *e*, for the purpose of discharging the articles when made. *f*, *f*, are fixed cores or blocks, screwed into the fixed plate *a*, *a*, for the purpose of forming the hollow centre of the rose or ring. A series of pressers or pistons *g*, *g*, *g*, are mounted vertically in a plate *g**, for the purpose of securing their proper descent in the mould-plate. Pressure is applied to the pistons *g*, *g*, in any convenient manner. Fig. 7, is a cross section, shewing the position of the several parts before the pressure is applied. The mould having been filled with the pulverized matter, the pistons *g*, *g*, are brought down and made to compress the same. The plate *g**, with its dies or pistons *g*, *g*,

is now removed, and the plates *b*, and *d*, are pushed up by means of the rod *e*; whereby the rings, roses, or other articles are pushed up from off the fixed cores *f*, *f*: the plate *b*, may then be taken away with the articles sticking in the holes thereof, from whence they may be removed by hand with facility.

Some articles, such as knobs and door-handles, are of such a shape that they cannot be made in simple dies, but necessarily require divided dies; which, when the article is formed, will admit of being taken to pieces to release the manufactured article. Fig. 8, is a vertical section of an apparatus for making knobs, door-handles, and other articles which require divided dies. *a*, *a*, is the foundation-plate; *b*, *b*, the mould-box; *c*, *c**, the die or mould, which is shewn detached, and in section at fig. 9; *d*, *d*, a plate, provided with a projecting block *d**, through which passes the core-pin *f**, which is screwed into a plate below; and *g*, the piston for compressing the materials. The divided die *c*, is supported in the mould-box *b*, *b*, by the horizontal pins or wires *p*, *p*,—see the horizontal section, fig. 10, and vertical transverse section, fig. 11. These pins support the die while the mould is being filled; and when the piston *g*, is ready to descend, the pins *p*, must be withdrawn, and the dies *c*, allowed to yield to the pressure. Another core-pin *q*, is inserted, for the purpose of making the hole through which passes the screw, whereby the knob is held on the spindle.

Instead of making the rose or that part of a door-lock knob which forms the base, and is fastened to the door, wholly of earthenware or porcelain, the patentees propose to form the outer ring only of such material, and to fix a cup or disc of metal in it to receive the screws for fastening it to the door.

A rose, of the improved form, is shewn at fig. 12, and as applied to a door at fig. 13. *h*, is the earthenware part of the rose, and *i*, is a metal disc, which is secured to the ring *k*, by burnishing over the brass flanges *j*. Screw-holes are made in the disc *i*, to receive the screw, whereby the rose is attached to the door. By this means there is no risk of breaking the rose by screwing up too tightly.

In order to prevent drawer and other like knobs from coming off the furniture to which they are attached, one or two indentations are made in the base of the knob, sufficient to receive a projecting nail or screw, which must be driven into the furniture under the seat of the knob; so that when it is drawn close, by means of a nut and screw on the other side of the furniture, it cannot be turned round.

Figs. 14, and 15, shew an improved construction of fastening for cupboard-doors, consisting of a knob *k*, which carries, at its under side or base, a plate *n*, having a sector-slot made therein. In this slot a pin—fixed upon the metal plate *n*, and fastened on the front side of the cupboard-door under the knob—works, when an axial motion is given to the knob *k*. This motion is limited, according to the length of the sector-slot.

Figs. 16, and 17, shew an arrangement of machinery for facilitating the use of the improved dies or moulds. Fig. 16, is a vertical section of the machine, and fig. 17, is an end elevation thereof. A, A, is the bed or foundation-plate of the machine, on which are fixed the side-standards B, B, which support the working parts. The moulds or dies, combined in any convenient number, as shewn in the figures, are seen at C, and are placed upon a cross-bed A*. Pressure is applied to the top of the series of moulds or dies by means of a block or plunger D, which is secured to the lower end of the screw E. When the articles are formed, the series of dies C, must be raised up by means of the lifting-rods F, F, connected by a cross-bar to the upper end of a toothed rack G, which is actuated by a pinion H, on the axle of the fly-wheel I. By turning this wheel, by means of the handle, and thereby raising the rack G, and moulds C, the upper part of the latter will be forced past two spring-catches I, I, on each side of the frame; and then, upon allowing the frame F, to descend, the lower part of the moulds C, will descend with it, leaving the upper part resting on the catches. The upper part of the moulds C, is then pushed forward under the plunger J, which, being attached to the lower end of the rack K, is brought down by means of the pinion L, on to the upper side of the moulds; and the articles that have been formed therein are thereby forced out of the dies, which, on being replaced in their original positions on the plates A*, are then ready for a second charge of the pulverized material.

The patentees claim, First,—the use and application, for the purposes herein set forth, or any analogous purposes, of moulds or dies with moveable parts, by means of which the varying quantity of material required for parts of different thicknesses of the article to be produced may be increased, diminished, or regulated, at pleasure. Secondly,—the method shewn and described, with reference to figs. 5, 6, and 7, or any mere modification thereof, for constructing compound dies for the purpose of making small articles of simple form;

whereby the said articles, when made, may be removed from the dies with greater facility than when the compound dies or moulds are made or formed in one single block of metal. Thirdly,—the use of divided or segmental dies for the manufacture of articles of pulverized earthy materials. Fourthly,—the machine shewn at figs. 16, and 17, or any mere modification thereof, for effecting the same object. Fifthly,—constructing roses, with a metallic plate or disc adapted thereto, for the purpose of receiving the screws whereby the rose is affixed or secured to the door. And, Lastly,—adapting to the back of knobs for doors or cupboards, a slotted plate, for the purpose herein set forth and described.

To Peter Fairbairn, *of Leeds, in the county of York, machinist, for certain improvements in self-acting reeling machinery for reeling flax and other yarns into hanks.*—[Sealed 5th November, 1852.]

The object of this invention is to facilitate the removal of the hanks of yarn from the reels of reeling-machines. To attain this end it is necessary to reduce the diameter of one end of the reel, and thereby to slacken the yarn which has been wound on in hanks from bobbins mounted loosely in the reeling-machine. Hitherto the practice has been to joint one or more of the stretchers or radial arms of the reel, to allow of one end of the longitudinal bars, which they respectively carry (and which form the periphery of the reel), to be depressed or brought nearer to the axle of the reel, and thus the diameter of the reel has been reduced. This mode of constructing the reel has not, however, been found to afford sufficient facility for removing the hanks, from the irregular figure produced by the depression of one or two bars having still the property of holding the hanks more or less in tension. To avoid this inconvenience the patentee proposes to depress all the bars simultaneously by jointing the stretchers at one end of the reel to a central sliding tube or runner; which, when driven inwards, will be capable of drawing in with it all the stretchers simultaneously, and thereby contract the reel to a conical form.

In Plate X., fig. 1, is an end elevation of a contracting and expanding reel, shewing one mode of carrying out this invention; and fig. 2, is a longitudinal section of the reel, in its expanded state. *a, a,* is a spindle, to which an end-plate *b,* is keyed: this plate *b,* is cast with radial sockets, for the purpose of

receiving a series of radial arms or stretchers *c, c, c,* to which the bars *d, d, d,* forming the periphery of the reel, are jointed. The other ends of these bars are jointed to similar radial arms or stretchers *e, e, e,* which are connected, at their inner ends, to a sliding tube or runner *f.* The shaft *a,* is provided with a feather-edge, upon which the runner *f,* works. The length of traverse of this runner is determined by two collars *g, g*,* which are affixed, by pins, to the shaft *a.* Mounted on the runner *f,* is a spring-catch *h;* which, by taking on to a flange on the collar *g,* will secure the runner in the position shewn at fig. 2, and thereby keep the reel expanded ready to receive the yarn from the bobbins. The yarn is drawn down from the bobbins and attached to the reel in the ordinary way; and when sufficient yarn has been wound on to form hanks of the required weight (the reel having been rotated for that purpose), the rotation of the reel is stopped, the spring-catch *h,* is raised by the hand of the attendant, and the runner is pushed into the dotted position of fig. 2. By this means the stretchers *e, e,* are inclined inwards, and the bars *d,* are drawn into the position shewn by dotted lines in the figure; whereby the reel is made to take a conical form; and thus all tension is removed from the hanks of yarn, which will now hang loosely on the reel ready to be disengaged therefrom when the reel is lifted out of its bearings. Reels of this construction are proposed to be applied to all self-acting reeling machinery.

The patentee claims the application, to self-acting reeling machinery, of reels for receiving hanks of yarn, constructed in the manner and for the purpose above set forth.

To Edward Charlesworth, *of the City of York, Gent., for improvements in bill or letter-holders.*—[Sealed 1st March, 1853.]

This improved bill or letter-holder consists of a wire, pointed at one end, and hollowed or drilled out at the other, and then bent into a spiral coil or ring, as shewn in Plate X., at fig. 1. On forcibly pulling the extremities of this coil in opposite directions, the point at one end may be lodged within the hollow at the other, so as to form the coil of wire into a ring, with a socket-joint at one point; and which joint will remain closed by the elastic force of the ring or coil of wire, so long as the ends are not forcibly unsocketted. This ring or coil of wire is fixed in a handle; which handle, besides being a convenient

appendage in the ordinary manual use of the invention, by preventing the bills or letters from passing that point of the ring at which the handle is attached, readily enables such bills or letters as have been first filed, to be distinguished from those put on at a subsequent date. Fig. 2, represents the ring or coil mounted in a handle.

The holder, in the form above described, may be conveniently hung upon a nail or hook, after the manner of ordinary bill and letter-files, and taken down for use as required; but, in order to give greater facility for its use, when in very frequent requisition, a block or stand, made of wood or other suitable material, having a central perforation to receive the handle of the holder, may be employed, as shewn in the figure. The block may also have a cleft or groove *b, b*, made therein, as shewn in the plan view, fig. 3, to allow of the holder being fixed in the stand by the ring. In this latter case a moveable plug or wedge is inserted into the hole or perforation *a*, at the side of the groove, in order to assist in fixing the holder securely in the block. This block may be employed as a stand for the holder-ring, either with or without the handle, as may be found most convenient, as shewn at figs. 4, and 5.

In placing bills or letters upon the holder, the pointed end of the wire is passed through the paper; but, as it is more convenient to secure the documents near their margin instead of passing the wire through the centre or middle, the patentee employs rings or discs of adhesive card-board, paper, parchment, or other suitable material, which, being stuck upon the bill or letter, strengthen that part through which the wire of the holder is intended to pass; thereby rendering it less liable to tear from rough usage. When it is desirable to avoid making a hole in a paper that is required to be filed, the adhesive protector is attached by only a portion of its adhesive surface,—the unattached portion being allowed to project beyond the margin of the paper in question, as shewn at fig. 6; and through this free portion of the protector the wire of the holder is passed. These "adhesive protectors" are placed in a box, which may be attached to the handle of the holder, as shewn at fig. 2, or be sunk in a space hollowed out in the block or stand, as shewn at fig. 3, or they may be kept detached from either.

In removing any one particular bill or other document from the holder, the ends of the wire must be socketted or connected, so as to form a ring; and those bills which are above the one required to be removed, must be passed over the joint, which latter is to be then unsocketted to allow of the

bill in question being removed; but, if bills are filed by means of the adhesive protectors, any bill may be removed by simply tearing through the protector.

The patentee claims the exclusive right to the manufacture of bill and letter-holders, constructed as herein shewn and described; and also the use and manufacture of the adhesive protectors, for the purposes above shewn and described.

To ELIZA CUNNINGTON, *of Devizes, in the county of Wilts, spinster, for improvements in the decoration of furniture, panels, and other surfaces.*—[Sealed 12th April, 1853.]

THIS invention refers to a mode of decorating articles of various kinds, and also parts of buildings, by the employment therefor of certain natural productions (instead of copies or imitations of such productions), which, when properly prepared, are to be covered with glass, talc, or other translucent material. The natural productions, preferred to be used, are those which possess a filamentous character, as mosses, ferns, or other cryptogamous plants, grasses, and such like vegetable matters. These plants, taken fresh gathered, are spread out on sheets of paper or other suitable substance, and arranged so that, after being submitted to pressure, they will present a graceful and artistic appearance. When pressed and dried, after the manner usually adopted by collectors of plants, they are to be dyed or colored, or coated with gold or silver, or other metallic tissue, according to the tone of decoration required to be produced. After being thus treated, these specimens of natural productions are arranged on a plain or colored ground, either in groups (in imitation, for example, of forest scenery), or in the form of wreaths or borders, or otherwise, as taste may dictate; flowers and leaves of plants, similarly treated with color or with a metallic coating, being occasionally introduced for the sake of variety. Over the decoration thus produced, a plate of glass or talc, or a sheet of pure gelatine or other analogous substance, is applied, according to the nature of the article decorated; and, when thought desirable, the under surface of the material forming the transparent covering is ornamented with border lines or other devices, to heighten the effect of the decoration. In some cases the finer portions of feathers, after being bleached or colored, or coated with some metallic tissue, are employed,—the same being arranged, either alone or in combination with the vegetable filaments, leaves, and flowers, to form ornamental

devices for the enrichment of surfaces, after the manner and having the appearance of inlaying. In selecting the plants for producing the ornamental devices above indicated, those are preferred which, when pressed and dried, present to the eye an inappreciable thickness; for, in that case, little or no shadow is cast therefrom by a side light, and, consequently, a closer imitation of inlaid work is obtained. For the same reason the patentee ordinarily prefers to employ an opaque ground, to receive the prepared specimens. In some cases, however, as when the specimens are, or have the appearance of being, aquatic plants, silvered glass is used as the ground, whereby a reflection of the under side of the plants will be obtained.

The principal articles proposed to be decorated by the application of this invention, are table-tops, fire-screens, work-boxes, and door and other panels; but, besides these, other appropriate applications will readily suggest themselves to furniture decorators and ornamentists.

The patentee claims the application of natural productions (of the kinds above indicated), when treated as above described, to the decoration of surfaces covered with a transparent material.

To WILLIAM EDWARD NEWTON, *of the Office for Patents, 66, Chancery-lane, civil engineer, for an invention of improvements in apparatus to be employed for veneering surfaces,—being a communication.*—[Sealed 14th February, 1853.]

THE object of this invention is to impart an equable pressure to the surfaces of veneers while glueing or cementing them on the wood or surface they are intended to cover.

In glueing or cementing veneers on surfaces, whether flat or curved, after the ordinary practice, many difficulties are experienced. If the veneer is not of uniform thickness, or the surface which presses thereon is not perfectly parallel with the surfaces to be veneered, the two surfaces to be united will not be brought together with equal force, and hence the union will be imperfect; and even when these defects are avoided, the glue or cement must be spread on with great care and uniformity, or union will be imperfect,—the parts having the most glue receiving the greatest pressure. Again, when the surface is large, numerous clamps must be used, and much time and labor is required to apply them; the pressure is also greater immediately under each clamp

than between them; and thus the veneer is rendered liable to blister. Another objection to the mode of veneering, heretofore practised, arises from the outlay for moulds or forms called cauls, suited to the various surfaces to be veneered.

According to the present invention pressure is imparted to the veneer by means of a fluid acting on a flexible substance interposed between the fluid and surface to be acted upon. This flexible substance is attached to, and makes part of, a vessel containing the fluid, or into which the fluid is to be forced, by means of which the pressure becomes self-adapting to all forms, and an equable pressure is imparted to every part of the veneer, irrespective of the configuration of the article under treatment. The fluid employed for imparting the pressure to the veneer, through the medium of the flexible substance, is used hot; whereby the glue is kept warm when the pressure is first applied, so that it may run freely and spread evenly over the surface under the action of the pressure; and the drying of the glue is hastened whilst the pressure is continued.

The figure in Plate X. is a longitudinal vertical section of the apparatus employed for carrying out this invention. *a*, represents a box or other vessel, which may be of any desirable form, and must be sufficiently strong and tight to hold water, and resist the required pressure. The bottom and sides of this box are made of metal or wood, and the top *b*, is formed of a sheet of vulcanized India-rubber, or other flexible waterproof substance, firmly attached all round to the upper edges of the box. This flexible sheet should be loose, so that it may bend or yield to the curvatures of any surface that may be applied to it. The edges of the box are provided with vertical screws *c, c, c,* and hand-nuts *d*, for the purpose of holding down and securing a cap-plate *e*, or, if desired, to force it down on to the flexible sheet *b*. The box is provided with a pipe *f*, with a stop-cock, and surmounted with a funnel for introducing water into the box. There is also a discharging-pipe and stop-cock *g*, for emptying the box; and also a third pipe *h*, called the pressure-pipe, with a stop-cock *i*. This pipe can be connected with a head of water, or with a force-pump, for forcing water into the box. The box having been filled with hot water through the funnel, the block *j*, to be veneered, is properly coated with glue or other cement, and the veneer *k*, is applied; after which the block is put on to the flexible cloth *b*, with the veneer on the cloth. The cap-plate *e*, is then put over the block *j*, and secured with the nuts; and water is

forced in through the pressure-pipe, until sufficient pressure is obtained to force the veneer into contact with every part of the surface to be veneered. This pressure is continued until the glue is set or dry; or a stop-cock in the pressure-pipe can be closed, and the apparatus laid by until the glue is dry; which drying operation will be hastened by the heat of the water introduced.

It will be obvious, from the foregoing, that, instead of hot water, other fluid may be substituted, such as heated air or steam, of high pressure; but this latter would be inconvenient from the necessity of keeping the apparatus in connection with a boiler until the glue is dry; or making the box of metal, and keeping it at the required temperature to maintain the tension of the steam.

If water or other fluid be used, iustead of a force-pump, the pressure of a column may be substituted; or, instead of forcing in the fluid, whether liquid or gaseous, after the vessel has been filled, the block to be veneered can be forced against the flexible cloth by means of screws, or their mechanical equivalents; and, finally, it will be obvious that, if desired, the fluid can be applied in the cold state, as the medium of pressure.

The patentee claims the method of pressing veneers on to surfaces to which they are to be glued or cemented, by means of a fluid acting on an interposed flexible substance, such as an India-rubber cloth or its equivalent, which will adapt itself to the surfaces substantially as described. And also applying the fluid, in a heated state, to make pressure, as above described, on the veneers, in the process of glueing them on, in order to keep the glue warm when the pressure is first applied; so that it may run freely and spread evenly over the surface under the action of the pressure; and then hasten the drying thereof whilst the pressure is continued, as specified.

To Frederick Richards Robinson, *of Charlestown, in the State of Massachusetts, United States of America, for an improvement in the gridiron or instrument for cooking steak or other articles by broiling*—[Sealed 20th October, 1852.]

This invention relates to an improved gridiron, for preventing steak from being burnt when broiling, and for catching the gravy which falls therefrom while cooking; and consists of a series or a frame of parallel troughs or spouts, having open

ends, and running into a surrounding spout; each of the transverse or parallel spouts being placed directly under a space of two of the bars of a grating, for sustaining the meat to be cooked; which grating is placed immediately over the frame of the troughs or gravy-catcher.

In Plate XI., fig. 1, is a plan view of the improved gridiron complete, and fig. 2, is a longitudinal section of the same. *a, a, a,* are a series of spouts, forming a metallic frame, and surrounded by a spout *b.* The several spouts *a, a,* are arranged parallel to each other, and at suitable distances asunder; and they are connected with an external or circumscribing spout *b,* and made to open at their two ends into the same. Between each of two of the transverse and parallel spouts there is a space *c,* whose width is made somewhat less than either of the two adjacent spouts. Directly over each of these openings there is a fluted or other proper shaped bar *d,* a little wider than the opening, and curved transversely and channelled lengthwise. These bars *d, d,* are placed parallel to one another, like bars of a common gridiron, having spaces *e, e,* between them; and are connected to a frame *f, f,* supported by feet, which rest upon the gravy-catcher below it. The gravy-catcher is constructed with handles *g, g,* and supporting feet *h, h,* which are sufficient in number to sustain it in a stove, or any article or surface on which it may be placed. The gravy-catcher is provided with two projections or lips *i, k,* which extend above it; each of the lips being formed with a hole, to receive one of two pins or studs, *l, m,* projecting from the ends of the grating or gridiron. These two projections or studs *l, m,* are provided with shoulders *n, o.* The distance between the shoulders *n, o,* added to the length of the shortest stud projecting from one of the shoulders, is a little less than the distance between the two lips *i, k;* whereby the cook, after inserting the longer of these projections through its lip, is enabled to do the same with the shorter one. When the shoulder of the shorter projection is moved up against its lip, it determines the exact position of the gridiron with respect to the gravy-catcher, and ensures the setting of the bars of the gridiron, directly over a space between two of the spouts, immediately beneath it.

The patentee remarks that a gridiron has been before constructed in a somewhat similar manner to the gravy-catcher in this invention, or composed of a frame of bars, connected with a spout to receive the gravy. In all such gridirons, the peculiar exposure of the meat to the heat radiating from the fire, and through the spaces between the bars of the gridiron,

renders that part of the meat which comes over such spaces very liable to be burned. Besides which, pieces, and the fat of the meat that exudes from those parts of it which are immediately over such spaces, fall into the fire, and are more or less wasted; and, falling upon the coals, often take fire and blaze up, so as to smoke or burn the meat. By the present invention, however, the meat is not only protected in a great degree from being burned, but all, or nearly all, the fat and pieces from those parts of it which are over the spaces between the bars, instead of dropping into the fire, fall into the transverse spouts of the gravy-catcher, and by them are conveyed into the circumscribing spout thereof. The pieces and fat from the remainder of the meat, or those parts which rest directly on the bars of the grating or gridiron, will run into and through the channels of the bars, and fall into the gravy-catcher.

The patentee claims a gridiron or broiling apparatus, as made of the gravy-catcher, constructed essentially as specified (viz., of a collection of parallel spouts, and a circumscribing spout or their equivalents), and a grating or frame of bars, or their equivalent, placed directly over and above such gravy-catcher, and having each of its bars wider than and arranged immediately over one of the spaces between the bars of the gravy-catcher,—all substantially as hereinbefore described and represented.

To Myer Myers, Maurice Myers, *and* William Hill, *all of Birmingham, steel pen manufacturers, for certain improvements in pens and pen-holders.*—[Sealed 26th October, 1852.]

This invention consists, firstly, in so combining a pen and pen-holder that the pen may be more readily connected to and disconnected from the holder, and the elasticity increased or diminished at pleasure, so as to suit the requirements of the writer. Secondly, in so forming a pen and pen-holder that the pen may either be held straight or in an oblique direction; which latter position is much desired by many writers. Thirdly, in making a metallic pen with the point or nib cut from the top or body of the pen, and then turned over, so as to give a greater amount of elasticity at or near the shoulders of the pen. Fourthly, in making and adapting metallic nibs or pens to quills, by means of different peculiar forms of piercing the pens and shaping the quills; and in converting and adapting quills for pen-holders, by a peculiar method of cutting such quills. Fifthly, in certain modes of making

pen-holders for holding any size or shape of pen in general use; which pen-holders are so contrived that, to whatever extent the pen and its holder may be corroded, the pen can be easily removed. Sixthly, in a certain form of pen, having a series of cuts of a curvilinear or pointed form, which will admit of pointed pieces of metal being bent downwards, and lapping one over the other, whereby that graduation of elasticity which is required by some writers will be obtained. Seventhly, in a peculiar form of pen, which is flattened transversely between the nibs, and is pierced, so as to increase the elasticity near the point. And, Lastly, in the application to steel pens and holders of the well-known processes of coating iron or steel by a deposit of copper; by which means pens and holders are colored and protected from oxidation, to which they are often liable when exported to foreign countries.

In Plate XI., fig. 1, represents a front view, and fig. 2, a longitudinal section of the improvements in pens and pen-holders, under the first head of this invention. A tube of metal (partly shewn at *a*, fig. 1,) is fixed to a stem of wood or other suitable material. This tube is slotted or pierced at *b*; over which is placed the outer tube *c*, which may be moved up or down, but is prevented from turning round by the hooked part *d*, which, being cut around in the form shewn, is bent inwards and works in the slot *b*, of the tube *a*. The pen *e*, is placed in the position shewn, and is secured by the sliding tube *c*, being drawn down over it; and, according to the extent that this outer tube covers the pen, so is the elasticity increased or diminished.

Fig. 3, represents the improvements under the second part of this invention; in which *f*, is a tube, to which the pen *g*, is attached by means of the pin *h*, working in the slot *i*; or the pen may be made in the form shewn at *e*, fig. 1, whereby the necessity of using the pin *h*, will be avoided. An outer tube *j*, is shewn in section, which must fit the inner one moderately tight: the tube *j*, has a small hooked part at *k*, so that it may come in contact with a corresponding part in the pen. It will therefore be obvious, that when the outer tube is pushed down, and the corresponding parts of the pen and tube come in contact with each other, the pen will be thrown into an oblique position, which may be varied to any required degree.

The third part of the invention is shewn at figs. 4, and 5; fig. 4, shewing the pen in flat cut, ready for bending into form; and fig. 5, the finished pen, shewing that the point at

l, fig. 4, has been bent down to form the nibs,—thus placing the elasticity of the pen on the shoulders at *m, m*.

The fourth part of the invention relates to the manufacture of pens or nibs, to be applied to quill-holders; and also to the cutting and forming of the quills at their ends in such a manner that they will more readily hold such steel pens as are in general use. Figs. 6, and 7, shew a front and edge view of one of the nibs or pens applied to a quill-holder, which is shewn in dots at fig. 7. Another form of nib or pen is shewn at fig. 9, and as applied to a holder at fig. 8. It will be observed in this case that the point of the pen has been taken out of the body, as at fig. 5. At figs. 10, and 11, a quill-holder is shewn, in longitudinal and end views, as applicable to pens in general use.

Fig. 12, represents a holder composed of two tubes,—the inner tube being in front view, and the outer one in section; and fig. 13, is a side view of the same, partly in section. The part *n*, readily yields when the pen is inserted or withdrawn. Fig. 14, is another holder, in which the required spring, for holding the pen, is obtained by bending a piece of metal in the form shewn at *p, p*, which is secured by a small pin *q*, passing through it and the tube *o*; but, before the spring is fixed in, a small piece of India-rubber is inserted, as shewn at *r*. Fig. 15, represents a modification of the spring *p*, as applied to a quill instead of a metal tube. In place of being held by a pin, a slip of metal is passed round the quill, and the ends are secured by being passed through the hole *t*, in the quill, and through a corresponding hole in the spring, and then bent in opposite directions. Fig. 16, shews another improvement in pen-holders, in which the tube *u*, is shewn in section, and is pierced or cut in a longitudinal direction. In this tube is placed a spring, in the form shewn at *w, w*: it will be seen that the spring is held in position by its being brought through the tube at *x*, and bent over. Fig. 17, shews the barrel of a holder in section,—the spring *w*, in this instance, being of a different form, and secured from the back, as shewn at *x*. Figs. 18, 19, 20, 21, and 22, represent other forms of pen-holders, wherein the spring, in each, is obtained by the peculiar form in which the tubes are cut or pierced for receiving the pen, and which will be readily understood by inspecting the figures; and fig. 23, is the shape of the blank from which fig. 24, is formed.

In the sixth part of the invention, fig. 25, represents a pen in the flat,—the lines shewing the form in which it is pierced or cut; and fig. 26, is an edge view of the pen bent into

form. The point at $a*$, is first bent in the direction of the top of the pen; and the points $b*$, and $c*$, are bent downwards towards the nib or point of the pen, so that they all rest one on the other. By this means the elasticity of the pen is equalized and distributed, and the flow of ink will be regulated; the pen will also hold more ink at a dip than those of the ordinary construction.

Figs. 27, and 28, represent side and edge views of the seventh part of this invention, which relates to flattening the pen transversely between the nib and the pierce,—the curve being either thrown outwards or inwards, as shewn by dots at $d*$, fig. 27.

The last improvement, which relates to coloring of pens and pen-holders, and preventing them from oxidizing, is effected by coating the same with copper, by any process whereby copper may be deposited on iron or steel.

The patentees claim the making of pens as above described and represented; and also for coloring and protecting of steel pens and pen-holders from oxidizing by coating them by a deposit of copper.

To William Edward Newton, *of the Office for Patents, 66, Chancery-lane, civil engineer, for improvements in the construction of bearings or steps for shafts, turn-tables, or moveable platforms,—being a communication.*—[Sealed 6th January, 1853.]

In carrying out this invention the patentee employs a series of rollers, made in the form of double frustrums of cones, united at their bases, and adapted to run in grooves, of nearly corresponding form, made in the surfaces, between which they are interposed.

The inner frustrums of the rollers and the corresponding parts of the surfaces of the grooves, between which they are interposed, are made on bevils, proportioned to the diameter of the rollers and the grooves in which they run; such as would represent the pitch lines of bevil cog-wheels of the same proportions. This will ensure the rolling of the rollers, about a common centre, without slip; and, to prevent the rollers from being wedged outwards, or forced out of their proper paths, their outer ends are made of reversed frustrums, with the surface of the grooves of nearly a corresponding bevil; so that, when the rollers are in place, two enclosing surfaces will be in contact with the inner frustrums of the rollers throughout their length; but the said surfaces, in-

stead of being in contact with the outer frustrums, will deviate a little therefrom. By this combination the rollers are prevented from being forced out of their true path; and hence they will roll around and bear the weight on the surface of the inner frustrums,—thus avoiding the practical objection to the methods heretofore tried.

In Plate XI., fig. 1, is a cross section of the step of a vertical shaft, and fig. 2, is a horizontal section thereof. In these figures, *a*, represents the lower extremity of a shaft, and *b*, a step or box. Between these two are interposed a series of rollers *c*, each in the shape of two frustrums of cones, united at their bases. In the end of the shaft *a*, and also in the surface of the step *b*, are formed concentric grooves *d*, *d*, of the same capacity, but inverted. The width of the grooves should be a little greater than the entire length of each roller, so that the rollers may have a slight end-play, without coming in contact with the sides of the grooves. The inner frustrums of all the rollers, and the bevil of the grooves in the end of the shaft, and the surface of the step, should be on lines coinciding with the axis of the rollers and of the shaft, as in determining the pitch lines of bevil cog-wheels; so that as the shaft turns and the rollers are carried around, they will, by their conical form, travel in a circle, of which the axis of the shaft is the centre.

The outer frustrums of the rollers should be the reverse of the inner frustrums, but slightly more abrupt, or less in diameter towards the outer ends, fig. 1; or the surface of the grooves, in which this part of the rollers run, should be slightly flattened, so that the outer frustrums will run in contact with the surface of the grooves at their bases, and be very slightly separated at the outer end.

From the foregoing it will be seen that, as the shaft rotates, all the rollers will travel around the axis of the shaft without slip; and the tendency to force the rollers out of the true circle, by the pressure and weight acting on them, is resisted by the outer and inverted conical surface; so that, by this means, the rollers are kept in place, and travel in a circular path around the axis of the shaft; thus avoiding slip and the friction consequent thereon, except the small part of the surface of the outer frustrums, where the slip and friction must be very slight, as it only takes place near the base, and simply to keep the rollers in place.

The patentee also shews, in his specification, the application of the principle to a turn-table for railroads; and he remarks, that the invention can be applied to any turning

platform, or to shafts, whether vertical, horizontal, or inclined; and either to the ends of the shafts, or to flanches, or shoulders projecting therefrom; and when applied to horizontal shafts, such as the shafts of propellers, the object is to reduce the friction and wear due to end thrusts.

He claims making the rollers in the form of double frustrums of cones reversed, and united at their bases, and travelling in circular grooves of nearly corresponding form in the surfaces, between which the rollers are interposed,—the inner frustrums supporting the weight and causing the rollers to travel in a circle concentric with the shaft or other rotating body; and the outer frustrums, combined therewith, preventing the rollers from being forced out of their circular track by the weight or pressure, as set forth.

To EDWARD DUKE MOORE, *of Ranton Abbey, near Eccleshall, in the county of Stafford, merchant, for an improved mode of treating the extract of malt and hops.*—[Sealed 2nd March, 1853.]

THIS improved mode of treating the extract of malt and hops, commonly called wort, consists in concentrating the extract of such substances, when in combination as wort; so as to render the same more portable and applicable for exportation to distant countries, and to enable private families to make their own beer, in any desired quantity, without the ordinary cumbrous apparatus.

In carrying out this invention, the extract of malt and hops is obtained according to the most improved method of brewing; and when taken from the hop-back it must be run into an evaporating apparatus, which is hereafter described at length.

The extract of malt and hops, which is called wort, when obtained, is passed from the hop-back into an evaporating apparatus, consisting of a shallow pan or vessel, heated by a water-bath underneath, which bath is to be maintained at the temperature of about 187° Fahr. The evaporating pan being supplied with wort, an assistant commences the agitation of the liquor, either by means of a spatula or other instrument constructed for that purpose, and worked by hand, or by means of a succession of spatulas, or other instrument, constructed and arranged over the pan, and which, by a moving power, are kept in constant motion. The wort being thus kept in a state of gentle agitation, the scum, as it rises to the surface is removed therefrom; and these operations being continued for

a time, varying in duration according to the strength of the wort and the state of the atmosphere, the wort undergoes a chemical change, very advantageous to its strength and purity, and eventually is evaporated down to about one-sixth its original bulk, and to the consistency of inspissated honey, or of paste in a semi-fluid state. The pan is then tilted, by means of a frame or suitable apparatus, so that the wort will the more readily run out; and, by thus tilting the pan, the wort is prevented from charring or being overheated, and adhering to the bottom or sides of the pan during the process of removal. The wort, being of the consistence of paste, is then received into convenient tubs or buckets; and any further scum, which has been formed during the process of evaporation, is carefully taken away. The concentrated wort is then poured into gallon tins, or other suitable vessels, which are hermetically sealed for exportation, and preservation, or in other convenient jars or tins, for home use. In order to make use of this improved and portable preparation of malt and hops, for producing beer, it will only be necessary to add to any given quantity of the extract the requisite quantity of boiling water, according to the degree of strength required, and set up fermentation in the usual manner: after fermentation has ceased, the beer is run off into casks.

The evaporating apparatus consists principally of two shallow pans or vessels, placed one on the other. The lower pan is 4 feet wide, 16 inches deep, and 16 feet long, and is made of copper or other metal, with a flange two inches wide. Over this pan is placed another pan, made of tinned metal, about the same length and breadth, but only about 6 inches deep. The upper pan is furnished with a flange formed so as to fit accurately over the flange of the under pan. By means of a layer of red lead and screws, the flanges of the two pans are brought so closely together that no escape of steam or water can take place. The whole apparatus may be fixed on a frame so as to be tilted with facility when required. The lower pan is filled with water; and a steam-pipe, communicating with a boiler conveniently placed, is inserted through a hole in the upper part of the lower pan, and is conducted along the centre of it and fixed firmly to the opposite end of the vessel. This pipe is perforated with small holes along its whole length, on its under surface, for the purpose of allowing jets of steam to issue downwards and heat the water (which has been previously admitted into the water-bath) to the temperature required. A stop-cock is placed at or near the union of the pipe with the pan; and the bulb of a thermometer being

placed in the water, the attendant can regulate the heat of the water with great accuracy, by the admission or exclusion of steam. In the flange at the opposite end of the bath a pipe is fixed, and carried into a convenient reservoir, to allow the escape of air and of the surplus water which is generated by the condensation of the steam. There is also a pipe or sluice conveniently placed at one end of the evaporating pan, to admit of the wort, when concentrated, being readily run off; and to facilitate that operation, the pan may be tilted by means of a screw or lever, or any other suitable apparatus, attached to the frame on which the water-bath is placed.

By means of the process above described, of preparing a concentrated extract of malt and hops, certain advantages are obtained over the old plan of brewing. It is well known that the wort, when drawn from the mash-tub, still contains an amount of starch which has not been converted into sugar; whereas, during the present process of evaporation, nearly the whole of the starch, which has before escaped the conversion in the mashing-tub, is changed to saccharine matter, and therefore adds strength to the beer.

The patentee remarks, that in the process above described, the quantities of the infusion are not, in the least degree, impaired; but, on the contrary, from the low temperature at which the concentration is effected, the aroma of the hop is completely preserved.

In the ordinary mode of brewing, the albuminous matter, which is the great cause of "rope," and, frequently, of a second or acetic fermentation, is not thoroughly removed. This albuminous matter is, in the above process of concentration, very nearly, if not entirely, got rid of, as the scum is carefully removed when it rises to the surface of the wort during concentration.

The patentee claims the manufacture of a concentrated extract of malt and hops by treating the two, when in combination as wort, in the manner and for the purpose above described.

To Adolphe Marius Alexandre Iglesia, *of Russell-place, Fitzroy-square, in the county of Middlesex, mechanic, for improvements in producing ornamental glass surfaces.*— [Sealed 9th April, 1853.]

This invention, for producing ornamental glass surfaces, consists, first, in the production of ornamental surfaces in

imitation of marble, granite, or any substance capable of a similar polish, by applying to the under surface of plates or pieces of glass, paper, or any other suitable pliable material, on which may be printed, lithographed, drawn, or colored, by any of the well-known processes, a design, device, figure, or pattern, in imitation of such marbles, granite, or other substance; secondly, in ornamenting the under surfaces of glass by applying thereto paper or any other pliable material on which may be printed, lithographed, drawn, colored, or otherwise produced, by any other suitable process, a design or device, which shall have the effect of designs painted upon such surface, or of mosaic or other ornamental work. The third part relates to a method of consolidating or strengthening the pieces of glass thus ornamented, so as to give them the strength of marble or stone.

The process employed for the first and second of the purposes aforesaid is as follows:—Gelatine, or common glue, or any other gelatinous matter, is dissolved in a vessel of pure water, by the employment of a water-bath, at a gentle heat. In selecting the material to be employed for this purpose, such as is of a white color is preferred. The particular strength of solution, which is preferable to employ, is of the strength ordinarily used for the purposes of carpentry. When the glue or gelatinous substance is entirely melted it must be strained through a sieve, so as to remove all impurities; after which it must be warmed to about 80° Fahr., when it will be fit for use. The patentee then takes the piece of glass to which the paper or other substance, having the design thereon, is to be applied, and, after washing the glass well with warm water, lays the paper upon it, with the decorated surface uppermost. He then passes the solution all over it by means of a sponge, and afterwards removes the paper from the glass, and wets the glass well with the solution; after which, he replaces the paper upon the glass, with the moistened surface undermost, and passes the solution again over it with the sponge,—taking care to remove any folds or creases which may shew themselves. The piece of glass is then turned over, so as to place the paper underneath it; and, after raising the glass with the left hand, warm water is passed over the surface of the glass with a sponge, until all the glue is completely melted. By means of a piece of steel, with the edge rounded, the glue is pressed out from between the paper and the glass; and, lastly, the glass is turned, so as to place the paper uppermost. The

same operation is repeated until the superfluous glue is removed; after which the back of the paper is cleaned with a sponge, moistened with warm water, and it is then left to dry. The temperature of the water employed, in this operation, should not exceed 80° to 100° Fahr.

The process, above described, is applied to the production of patterns made of pieces of paper of various colors, in the following manner:—The separate pieces, arranged so as to form the desired pattern, design, or device, are glued upon a cloth. The design, thus composed, may, when dry, be fixed on the glass in the manner described above; then, upon moistening the back of the cloth, and carefully removing it, the pieces forming the design will remain and adhere to the glass. In order to form such a pattern, the patentee applies the paper (which is to form the foundation of the pattern) to the glass, in one piece; and afterwards cuts out such parts as require to be removed, to allow of the introduction of the design, and removes them by means of a little warm water and a brush, and any blunt instrument, and fills up the vacant spaces with the paper, which must be attached by the methods before described. The glass employed may be of any kind,—care being taken to select such pieces as are not much curved, and are not very brittle.

The third part of the invention, namely, the strengthening of the glass plates, prepared in the manner above set forth, is effected in the following manner:—When the paper attached to the glass is quite dry, a resinous composition is applied to the back of it, which is hereinafter called "the mastic," and is made of rosin, plaster of Paris, grease, dry sawdust, cotton flock, or, in lieu of the last two substances, of sand. The proportions of the mixture, which is preferred, consists of 4 lbs. of rosin, 4 lbs. of plaster of Paris, ½ lb. of grease, and ¾ lb. of sawdust. If it is desired to make the composition very hard, the quantity of grease may be diminished, or it may even be omitted altogether. All the substances may be put on together, and melted over a slow fire, and the whole stirred up, with a piece of iron, until they are well mixed together. Before applying this mastic, it has been found useful to cover the back of the paper with a mixture of glue and whitening, or of glue and plaster of Paris, which should be allowed to get quite dry. The use of this covering is to protect the glass from being cracked by the heat of the mastic; but, if care be taken in the application of the latter, it may be dispensed with. To prevent the risk of the front of the glass being scratched, it is covered over

with a similar mixture. The mastic is applied at a temperature just sufficient to keep it melted. In applying the mastic, the glass is laid upon an even surface of wood; and if the surface of the glass is not quite flat, weights of about 6 or 8 lbs. each, at a distance of 2 or 3 inches from each other, are placed upon the edge of it, so as to flatten it. The mastic is then laid evenly, with a trowel, upon the paper until it is ⅛th of an inch thick, commencing from the outside and changing the position of the weights, as the operation is proceeded with, to a part where the mastic is dry enough to support them, and it is applied gradually, so as not to heat the glass suddenly. When the mastic is quite dry, slips of slate are employed, about 8 inches broad and ¼ of an inch thick, and of a length regulated by the size of the glass, but not exceeding 2 feet; through different parts of which must be previously pierced a number of holes by means of any common borer. These holes should be larger at the side which is intended to be nearest the glass than at the bottom. The bottom surface of the slate should be slightly warmed, and then a portion of fresh mastic may be applied to that part of the previously covered surface to which it is desired to apply the slate, and the slate is pressed down upon it, so as to force the mastic up through the holes. When, by this process, one piece of slate is attached to the mastic, another is laid alongside of it,—care being taken to fill up the intervals between the pieces of slate and the holes in these pieces, with the mastic, until the back of the glass and paper is entirely covered with mastic and slate. So soon as the mastic is cold, the glass will remain straight and solid, and the decorated surface will be perfectly preserved from injury. If a further thickness be required, it may be obtained by a repetition of the same process.

In the process above described, instead of slate, brick, stone, iron, or other metals in solid sheets or bars, or wood, or other substances, in frames or solid pieces, is sometimes employed as a backing for the ornamental glass surfaces, according to the nature of the work required. And the particular size and thickness of the material employed are of no consideration,—these being capable of variation, according to the circumstances of each case, and the degree of solidity necessary to be given to the glass. In cases where lightness is required, and where the glass is not exposed to violent blows, the backing is dispensed with, except the mastic, which is always employed.

In applying this invention to the coating of bricks or stone

with ornamental glass surfaces, the holes, by which the brick or stone is attached to the mastic, are not carried through the substance thereof, as in the case of slate, but they are only cut a little way into it.

The blocks or slabs, prepared as aforesaid, may be fixed in a wall, or used as a flooring, with ordinary cement, in the same way as ordinary blocks or slabs of marble,—requiring only similar precautions to those commonly used by workers in marble to preserve them from scratches; and pieces of wood, iron, or any other solid substance, may be let into the mastic, so as to give facilities for attaching the blocks or slabs.

The patentee claims ornamenting glass surfaces, as above described, with various devices, designs, or imitations of natural objects, by means of paper or other suitable flexible material, on which may be printed, lithographed, drawn, or colored, the desired device, design, pattern, or imitation. He also claims the methods, above described, of strengthening or consolidating such ornamented surfaces, and rendering them applicable to the various purposes for which they may be employed.

To Thomas Rhodes, *of Leeds, for improvements in the manufacture of manure.*—[Sealed March 12th, 1853.]

This invention consists in reducing wool or hair into a finely-divided condition or pulp, by such machinery as is employed in paper-making, and then dissolving or treating the same by acid and alkali. The classes of wool to which this invention is more particularly applicable are the waste products of wool obtained in spinning, and also in shearing cloths and other processes of the woollen manufacture, and also wool obtained by reducing old fabrics of wool to pulp or fine division. For the purpose of carrying this invention into effect, woollen rags or shoddy, or old hair-cloth, are reduced to pulp in a paper-engine, and the excess of water is strained off; the water which does not readily drain away being retained. Sulphuric acid is then mixed with the pulp, and ground bones, phosphorite, coprolites, burnt bones, or animal charcoal, is afterwards combined. Or the pulp and bones, or other matters, may be first mixed together, and then acted upon by sulphuric acid. For manuring turnips the following mixture is preferred:—To every 2 cwt. of the original shoddy or material about 4 cwt. of the sulphuric acid of commerce are added, and, when well mixed together, about 12 cwt. of ground

coprolite or mineral phosphate, ground bones, calcined bones, or animal charcoal, are added. When these materials are thoroughly incorporated or mixed, and the effervescing action has somewhat subsided, the mass is removed from the vat or vessel in which the mixing has been performed, into a covered place, where, by gradual drying, it becomes fit for use. The patentee observes, that enough water is to be left in the pulp to permit of its mixing easily with the other materials, so that, when mixed, it may be a semi-fluid mass. Or, in place of such water, urine, or gas-water, containing the alkali ammonia, may be used; by which means the manure will be rendered more valuable. When manuring corn crops, two or three times the quantity of shoddy-pulp is used to the same amount of the other ingredients.

The patentee remarks that he lays no claim to the use of coprolite, mineral phosphate, bones, or animal charcoal with sulphuric acid, in the manufacture of manure; but he claims reducing wool or hair into a finely-divided condition or pulp, by machinery, and treating and applying the same in the manufacture of manure, as herein explained.

To Christopher Hill, *of the Great Western Railway, Swindon, in the county of Wilts, for improvements in the manufacture of lubricating matters.*—Sealed 13th October, 1852.]

This invention consists in combining a pulp or paste produced from rice, potatoes, or other vegetable matters, with fatty or oily matters,—lime or alkali being likewise used in the combination. In order to carry this invention into effect, the vegetable pulp or paste, used in preparing the lubricating materials, may be obtained from all kinds of grain, or potatoes, or any other vegetable matters possessing similar properties; but rice is found to be most desirable. This pulp is prepared by softening the material used by boiling or soaking it in hot or cold water; and when it is sufficiently softened, certain proportions of alkali are added, until the whole of the ingredients are of a pulpy nature. The preparation is then ready for mixing with the fatty or oily substance, which, prior to mixing, should be partly saponified, by combining it with a solution of soda or caustic alkali and water.

When preparing the lubricating compounds, the proportions may be varied, according to the purposes for which they are to be employed. For instance, when lubricating railway and such like axles, first boil 1 cwt. of rice in a quan-

tity of water, sufficient to increase its weight about six-fold; and, when well boiled, add about 4 cwt. of liquid alkali, prepared as follows:—Take 1 cwt. of British alkali, 1 cwt. of lime, and 8 cwt. of boiling water, and stir the same well together; then, after standing for about twenty-four hours, the liquid will be ready to be combined with the pulp or paste. This liquid should not exceed five per cent. of soda in strength, tested according to the usual mode.

The 4 cwt. of alkaline liquid, above mentioned, having been mixed with the pulp, the whole is boiled and stirred well together for a short time; and the mixture is then run off and rubbed through a very fine sieve. About 2 cwt. of tallow, 3 cwt. of palm oil, 4 cwt. of caustic alkali, and 4 cwt. of water, are next melted and boiled together; and the pulp is then added, stirring it in, with the grease and alkali, until all are thoroughly mixed: the compound is then to be rubbed through a sieve, and passed into coolers to consolidate; after which it will be ready for use.

In order to make a cheaper lubricating matter for carts, waggons, and any slow vehicles or machinery having a slow movement, 1 cwt. of bean or other flour is made into a paste by adding it to, and stirring it with, about 6 cwt. of boiling water: 8 cwt. of lime-water, about the consistence of cream, made by pouring hot water upon the lime, are then added. When the flour and lime are well mixed together, 10 cwt. of fresh rosin oil are added, stirring the whole well till it all becomes thoroughly mixed and thick.

In making a fluid lubricating compound, to be used in place of oil, the patentee takes 3 cwt. of the liquid linseed, hereafter described, or a diluted rice-pulp, 1 cwt. of linseed oil, 1 cwt. of rape, 14 lbs. of the soda solution hereafter mentioned, or a diluted caustic alkali solution, and mixes them well together cold, until they are well combined. The liquid linseed, previously mentioned, is prepared by boiling 1 cwt. of the seed in sufficient water to yield about 12 cwt. of a good thickish substance. The soda solution, combined therewith, is prepared by dissolving 28 lbs. of soda in 2 cwt. of water.

The patentee claims the combinations of materials, herein described, in the manufacture of lubricating matters.

Scientific Notices.

INSTITUTION OF MECHANICAL ENGINEERS, BIRMINGHAM.

A paper was read by Mr. McConnell, "*On hollow railway axles.*"

With the view of improving the strength and durability of railway axles (the two most important points for insuring the safety and security of railway travelling), the writer, after repeated experiments, and obtaining all the experience and information he could collect on the subject, arrived at the conclusion that the hollow or tubular axle combined in itself, if properly manufactured, all the properties necessary to secure the best form for lightness, strength, uniformity of structure in the material, elasticity (to neutralize the injurious effect of blows and concussions), and consequent durability,—from having a greater freedom from deteriorating effects.

The selection of the tubular form of axle originated in the knowledge, that with a considerably less weight of material in the form of the tube, a much greater strength can be obtained to resist torsion, deflection by pressure or weight, or concussion from blows. The resistance of a solid cylinder to deflection and torsion increasing in proportion to the fourth power of the diameter (or the square of the square), but the weight increasing only as the square of the diameter, two solid cylinders, having the respective diameters of 4 and 5 inches, or 1 to $1\frac{1}{4}$, will have a proportionate weight of 16 to 25, or 1 to $1\frac{1}{2}$, but a resistance of 256 to 625, or 1 to $2\frac{1}{2}$. Then, if a hollow of $\frac{2}{3}$rds the diameter be made in the larger axle, its weight will be diminished $\frac{1}{2}$ ($\frac{2}{3} \times \frac{2}{3} = \frac{4}{9}$, or $\frac{1}{2}$, nearly), and its resistance only 1-5th ($\frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} = \frac{16}{81}$, or $\frac{1}{5}$, nearly), and the comparison with the smaller solid axle will then be 1 to $1\frac{1}{4}$ in diameter, 1 to $\frac{7}{8}$ in weight, and 1 to 2 in resistance; being double the resistance, with $\frac{1}{8}$th less weight.

The use of hollow axles was tried some years ago, but was not continued; the main objection being that there appeared a great difficulty of insuring, by the particular mode of manufacture adopted at that time, a sufficient uniformity of thickness of the sides of the tube thoughout, and also of the soundness of material. The mode adopted consisted of rolling two or three bars of a semi-circular cross section, which were welded together with butt-joints, but with no internal pressure, and with solid ends where the bearings came. These axles, having no maundril or internal pressure during the process of welding, were found to

be of a very uncertain strength throughout the axle; and the weakest point might be close to that part where the greatest force or strain would be exerted.

To overcome these objections, a mode of manufacturing railway axles has been introduced by the writer, which, it is believed, effectually accomplishes the objects in view, securing the utmost strength with the least possible amount of material, uniformity of structure of the iron, perfect equality of thickness of material, and soundness of manufacture.

The plan adopted is as follows:—A number of segmental bars, of the best quality of iron, are rolled to a zigzag sectional form, so as to constitute, when put together ready for welding, a complete cylinder, about 1½ times the diameter of the axle when finished; the bars fitting correctly together, so as to have no interstices, and overlapping in such a manner so as to insure a perfect and sound weld, when completed.

This cylinder of loose segmental bars is temporarily held together by a screw-clip; and each end being put into the furnace until a welding heat is produced, the bars are partially welded together, and the clip removed. The whole cylinder is then placed in the furnace, and brought to a proper welding heat; it is next passed through a series of grooved rollers, the grooves of which are furnished with a maundril, of an egg form, attached to, and supported on, the end of a fixed bar, firmly secured at the opposite end, to resist the end pressure or strain during the process of rolling. The maundrils are made of cast-iron, chilled, and are socketted on to the end of the bar, and secured by a screw-nut; so that they may be easily removed, when required.

The motion of the rolls is so arranged by a reversing clutch on the shaft, that as soon as the axle cylinder has been drawn clear through, the motion is reversed; and the axle, which has been drawn on to the maundril rod, is again drawn back through the same opening in the rolls: it is immediately passed through the next smaller groove of the roll, with a decreased size of maundril, and again reversed back through the same groove, in a similar manner, and so on through a series of grooves, in quick succession; each decreasing in size, and consequently increasing the compression and strength of the iron, of which the axle is formed; and by the last groove, through which it passes, it is reduced to the proper diameter. Each time it is changed from one groove to another, the axle cylinder is turned by the workman, a quarter round, so as to equalize the pressure on every part of its surface, to insure uniformity of the compression of the iron, and thoroughly complete a sound welding throughout every part of the axle.

As a proof of the soundness and perfection of the manufacture, it may be stated, that in every test applied, either by blows on the

outer surface, or by an immense splitting pressure,—by driving a maundril in the interior,—there has never been found, in any one instance, a failure of the weld, although the test has been applied to pieces cut off the extreme end, where it might be supposed the welding of the cylinder of the axle, from various causes, would not have so good a chance of being perfect.

The axle at this stage, after being welded and drawn down in the rolls to the required size, is taken at once to a hammer, where it is planished, between semi-circular swages, over its entire surface. A small jet of water plays upon it during this process, which enables the workman to detect at once, by the inequality of color, any unsoundness in the welding. From the hammer it is taken to the circular saws, where it is cut accurately to the length required, and made ready to have the bearings formed upon it.

On coming from the hammer, the axle is found to be perfectly clean, both inside and outside,—the scale being entirely removed. The ends are then re-heated, and gradually drawn down by a hammer to the proper dimensions and form of the journals; a maundril being inserted in the end of the tube during the process of hammering.

The formation of the journals can also be produced by a rolling machine, constructed of tables the entire length of the axle, rolling transversely; each table being a duplicate of the other, and matrices of the axle when finished. Or, in another way:—by two sets of rollers, each set consisting of three rollers, running vertically, being of the same diameter, and driven at the same velocity, formed exactly to the shape of the bearing, and set the proper distance apart from shoulder to shoulder of the journals.

As an illustration of the saving in dead weight, take, for instance a railway employing 15,000 waggons and carriages, and assume that each of these vehicles runs on an average 10,000 miles per annum. The weight of two axles of the solid description finished is, say, 5 cwt., and if replaced with hollow axles of equal strength, the weight per vehicle may be reduced $1\frac{1}{2}$ cwt.; this taken over one mile of the above stock per annum, will be 11,250,000 tons, and assuming the cost of traction for locomotive power at $\frac{1}{4}$d. per ton per mile, the saving will amount to £11,700 per annum, without taking into account the other advantages, and also the saving to the permanent way, &c.

In the samples of axles submitted to the meeting, two different kinds of bearings are shewn; the parallel bearing with the rounded shoulder, and also the double conical bearing, such as is used on the Great Northern, Great Western, Bristol and Exeter, South Wales, and South Devon Railways. In either description of bearing the hollow axle is good, although it is believed that the conical bearing for either the solid or hollow axle has a less tendency to injure the texture of the iron during the formation of the

journal than the parallel shouldered axle; and it appears a matter well deserving the consideration of this Institution, to ascertain what, under all conditions, is the best form of axle bearing.

The following experiments, conducted by Mr. Marshall, the Secretary of the Institution, have been tried for the purpose of ascertaining the comparative strength of the hollow and solid axles to resist a transverse strain:—

Each axle was supported on massive cast-iron blocks, fixed at a distance of 4 ft. 11 in. apart, to represent the support given by the rails to the axle. A cast-iron block weighing 18 cwt. was then let fall on the centre of the axle from a height of 12 feet, and the extent of bending was measured. The axle was then turned half round, and another similar blow given on the opposite side, bending it in the opposite direction. This proceeding was repeated until the axle was broken; and the particulars of the number of blows and amount of bending, are given in the accompanying Table, No. 1.

The general results of these experiments are as follows:—

An *old solid axle*, 3¾ inch diameter in centre, and 4¼ inch at ends, which had been at work three years, was bent 8¾ inches by the 1st blow; it was nearly straightened by the 2nd blow in the opposite direction, then bent 10 inches by the 3rd blow, and with the 6th blow it was broken in the centre square across.

A *new solid axle*, of the same dimensions, was bent 9¾ inches by the 1st blow, then nearly straightened by the 2nd blow, and bent 9½ inches by the 3rd blow, and by the 4th blow 2½ inches; and by the 5th blow it was broken ¾ inch from the centre.

The appearance of this fracture was crystalline over three-fourths of the section; the remaining part tough fibre.

A *new hollow axle*, 4⅝-in. diameter throughout, was bent 5 inches by the 1st blow, then nearly straightened by the 2nd blow, and bent again 5 inches by the 3rd blow. The 9th blow bent it 4½ inches, and the 10th blow 1⅜ inches. Up to the 15th blow it was bent alternately,—the bends varying from 2 to 3½ inches. There was no appearance of failure or cracking, but a slight rising of the surface at the 15th blow. The blows were continued to the 27th; the bends varying from 2 to 3⅝ inches; and at this blow a fracture took place across the middle of the axle, 1½ inches long. The 28th blow bent it ⅜ inch, and closed the fracture on the opposite side made by the preceding blow. By the 29th blow it was fractured two-thirds through, and bent 9½ inches,—the appearance of the fracture being very fibrous.

A second series of experiments was made, to ascertain the comparative strength of the journals of the hollow and solid axles to resist breaking.

Each axle was supported on an anvil, with the inner shoulder of the journal projecting 1½ inches beyond the edge of the anvil, to represent the support of the axle in the nave of the wheel;—100 blows with 24 lb. sledge hammers were then struck upon the upper side of the outer end of the journal; the men being changed after striking each twelve or thirteen blows alternately. The amount of bending of the journal was then measured, and the axle turned half over, and another 100 blows similarly given on the opposite side of the journal. The same proceeding was repeated, and the several particulars are given in the accompanying Table, No. 2.

The general results of these experiments are as follows:—

An *old solid axle*, with 3 by 5 inch journals, that had been at work three years, had one journal broken off with 205 blows, and the other with 53 blows: both fractures were square across the journal at the shoulder.

A *new solid axle*, with 3 by 6 inch journals, had the journal broken off with 570 blows,—the fracture being irregular in form and fibrous.

A *new hollow axle*, with 3 by 5 inch journals, had 400 blows on the journal, which bent down the end ⅝ inch, and produced a longitudinal split on the under side, 3¾ inches long, but no transverse fracture.

A *new hollow axle*, with the same size journals, received 800 blows on the end of the journal, which bent it down ⅛ inch, and split the journal longitudinally on both sides, but caused only a slight transverse crack near the shoulder, ¾ inch long.

The experiments on transverse strength, by a heavy weight falling on the centre of the axle, and giving the blow on opposite sides alternately, shew that the hollow axle is nearly double the strength, in that respect, of the corresponding solid axle,—the amount of bending being only 5 inches instead of 9¼ inches, and the number of blows required to break the hollow axle being 29, whilst the solid axle broke at the 5th blow,—shewing the hollow axle to be greatly stronger in resistance to fracture.

The hollow axle became ⅛ inch oval in the centre after receiving the 7th blow, and it was only ¼ inch oval after receiving the 28th blow just before fracture, as it bulged outwards 1-16th inch at each side, and 1-16th inch inwards at top and bottom from the original circular section.

The experiments on strength of journals shew that, instead of the journals breaking off square and short at the shoulder, as in the solid axles, the hollow axle journals stand a considerably greater number of blows, and then only split up longitudinally, instead of breaking off transversely,—being a very important advantage in point of safety in working.

TABLE No. I.

Experiments on the Transverse Strength of Axles.

(Axle supported at each end, 4 ft. 11 in. length between supports; cast-iron weight of 18 cwt. falling on centre of axle; blows given on the opposite sides alternately.)

Description of Axle.	No. of Blows.	Height of Fall. — Feet.	Deflection in centre from straight line. — Inches.	Total Bending by each blow. — Inches.	Remarks.
Old Solid Axle.........	1	12	8¾	8¾	Crack on underside, 2 in. long, 1-16th in. open; an old flaw.
3¾ in. diam. centre...	2	10	½	9¼	
4¼ in. diam. at ends	3	12	10	10½	
	4	11½	—7	3	The supports gave way laterally, reducing the force of blow; axle bent *upwards*, 7 in.
	5	11¾	1⅜	8⅜	Blow on same side as the last: four small cracks on underside.
	6	12	—	—	Axle broken square across, 3 in. from centre; surface of fracture crystalline.
New Solid Axle	1	12	9¾	9¾	
3¾ in. diam. centre...	2	11¾	¼	10	
4⅜ in. diam. at ends	3	12	9½	9¾	
	4	10	—2½	7	Lifting chain broke at 10 ft. height, axle bent *upwards* 2½ in.
	5	12	—	—	Axle broken square across, 3½ in. from centre; surface of fracture, 3-4ths crystalline, 1-4th tough fibre.
New Hollow Axle ...	1	12	5	5	
4⅝ in. diam. centre...	2	11¾	1⅜	6⅜	
4⅝ in. diam. at ends	3	12	5	6⅜	
	4	12	1	6	
	5	12	4¾	5¾	
	6	11¾	1⅛	5⅞	
	7	12	4½	5⅝	
	8	11¾	1⅛	5⅝	
	9	12	4½	5⅝	
	10	11¾	1⅜	5⅞	
	11	12	3¼	4⅝	
	12	12	1⅞	5⅛	
	13	12	3½	5⅜	
	14	12	2	5½	No appearance of failure or cracking.
	15	12	3⅜	5⅜	Very slight appearance of rising on the surface.
	16	12	2⅛	5½	No appearance of fracture on this side.
	17	12	3½	5⅝	
	18	12	2	5½	
	19	12	3⅜	5⅜	
	20	12	2¼	5⅝	
	21	12	3⅝	5⅞	
	22	12	2⅛	5¾	
	23	10½	3	5⅛	
	24	12	2¾	5¾	Some little appearance of rising on the surface.
	25	12	3⅛	5⅞	
	26	12	2⅛	5¼	
	27	12	3¼	5⅜	Fracture across centre of underside, 1½ in. long.
	28	12	3⅛	6⅜	Closed the fracture on the opposite side.
	29	12	9½	12⅝	Axle broken 2-3rds through, split longitudinally 5-in.; fracture very fibrous and irregular.

TABLE No. II.

Experiments on the Strength of Axle Journals.

(Axle supported at $1\frac{1}{4}$ inch length from inner end of journal; blows of 24 lb. sledge hammer on outer end of journal: each 100 blows given on opposite sides of the journal alternately.)

Description of Axle.	No. of Blows.	Total No. of Blows.	Deflection at end from straight line. Inches.	Remarks.
Old Solid Axle	100	100	$\frac{1}{4}$	Small crack at shoulder.
Been 3 years at work	100	200	$1\frac{5}{8}$	Crack 1 inch open at shoulder.
Journal 3 × 5 in. ...	5	205	—	Journal broken off square at shoulder; surface of fracture fibrous, partly crystalline.
Old Solid Axle ...... the other journal of axle.	53	53	—	Journal broken off square at shoulder; surface of fracture all crystalline
New Solid Axle ...	100	100	$\frac{1}{4}$	
Journal 3 × 6 in.	100	200	$\frac{1}{8}$	
	100	300	$\frac{3}{16}$	
	100	400	$\frac{3}{16}$	
	100	500	$\frac{1}{16}$	
	70	570		Journal broken off square at shoulder; surface of fracture mostly fibrous
New Hollow Axle ...	100	100	—	
Journal 3 × 5 in.	100	200	$\frac{1}{16}$	
	100	300	$\frac{3}{16}$	Longitudinal split, $2\frac{3}{4}$ in. long, 5-16 in. open, on under side.
	100	400	$\frac{5}{8}$	Split under side, $3\frac{3}{4}$ in. long, $\frac{3}{8}$ in. open; no transverse fracture.
New Hollow Axle ...	100	100	$\frac{1}{16}$	
Journal 3 × 5 in.	100	200	$\frac{1}{16}$	
	100	300	$\frac{3}{32}$	
	100	400	$\frac{1}{8}$	
	100	500	$\frac{5}{32}$	Split longitudinally 1 inch long.
	100	600	0	Cracked slightly obliquely.
	100	700	$\frac{1}{8}$	Split longitudinally $2\frac{1}{2}$ in. long.
	100	800	$\frac{1}{8}$	Split longitudinally 4 in. long, small piece broken out at end, slight transverse crack at shoulder $\frac{3}{4}$ in. long.

The author exhibited a number of specimens of the axles used in the experiments, and specimens of the hollow axles cut in two longitudinally, shewing the thickness of metal to be quite uniform throughout the axles and journals. He also shewed and explained an instrument used for measuring accurately the thickness of the

metal at the shoulder of each journal, and in the journal after the axle was turned; it consisted of a double sliding gauge, one sliding part being inserted into the open end of the axle, and shaped to fit closely to the inside of the shoulder; and the other sliding part fitting the outside of the journal of the axle: the whole gauge was held steady on the body of the axle by an arm and a clip. When the gauge was adjusted by a compound sliding motion, so as to fit the axle inside and out, the exact position of the outer sliding portion was marked by bringing a screw stop in contact with it, and it was then withdrawn sufficiently to allow the gauge to be disengaged from the axle by drawing the inner slide out of the axle: the outer slide was then brought back to its former position, by sliding it home to the screw stop; and the space thus left between the edges of the inner and outer slides, gave a correct outline of the thickness of the metal, which was traced at once on paper. Each axle was examined in this manner and registered before it was sent out to work, so as to provide against any axle being turned out in an imperfect state from the journal being accidentally cut into the metal too much at the shoulder.

The Chairman remarked, that in the fracture of the hollow axle all the iron appeared fibrous, but the fracture of the solid axles was mostly crystalline.

Mr. McConnell said he had found the same differences in all he had tried: the iron of the hollow axle was as fibrous throughout as the best bar iron. In answer to an enquiry he further said that the reduction in weight was about 2-5ths, theoretically, to obtain the same strength, but it had been taken at one-third of the solid axles, to be on the safe side. The hollow axles were being extensively applied on the North-Western, Midland, and Great Northern Railways; and more than 500 had already been made: some had been at work for nine months with entire satisfaction.

Mr. Norris observed that in the fractures of the new solid axles there was considerable variation, some parts being fibrous and other parts crystalline. He had tried many old axles that had been 20 years at work on the Liverpool and Manchester Railway, and none of them appeared crystalline on breaking off the journals, though several new ones were found to break crystalline; the new ones were about ¼ inch larger diameter in the journals. He doubted any crystallizing effect being produced by working on the railway; he thought it depended more on the original manufacture.

Mr. Slate remarked, that iron would be crystallized if overheated in the furnace, and the hollow axles might be injured in this way without proper care

The Chairman said the most fibrous bar could be made crystalline in one part by overheating it.

Mr. Clift suggested that less heat might be required to weld the hollow axle than the solid one, on account of the reduced substance of the iron.

Mr. Mc Connell observed, that in case of the sling chains for holding up in forging large bars, and in other similar instances, the continued concussion was found to have the effect of making the iron break in a certain time quite crystalline, though it had been quite fibrous originally: this was known to take place so regularly, that the time of breaking was reckoned upon, and they sometimes lasted only a few months. In the hollow axle there was a different condition of the iron from the solid axle; as in the latter the iron in the centre was not so solid as the outside, because the pressure was only applied on the outside; and the larger the bar the more this was perceived; but in the process of manufacture of the new hollow axle, in consequence of the internal pressure combined with the external, and the small thickness of the metal, the whole axle was made as solid as the outside of an ordinary axle. It had, in fact, two skins, one outside and one inside.

Mr. Slate remarked that the skin of iron was generally looked upon as stronger than the rest, but he doubted whether the skin was really of much importance to the strength, as it could only be a thin film of scale or oxide. He should like to see the experiment tried of a hollow axle bored out and turned so as to remove the skin, and expected it would be found to make little difference.

Mr. Mc Connell said the skin was important in cast iron, and the strength was considerably diminished if the skin was removed; he thought something of the same kind applied to wrought-iron.

Mr. May hoped the experiment suggested would be tried: he thought the ordinary idea of the skin was a delusion, both in cast and wrought-iron, and he believed there would even be found more strength per square inch in the area left if the skin were planed or turned off.

Mr. Duclos observed, that in cast-iron the skin would be different in composition, assimilating to steel, and harder than the rest of the metal, if not stronger, according as it was more or less chilled; but in wrought-iron the skin was mainly oxide of iron, and was really weaker than the pure iron.

Mr. Slate thought a cast-iron bar, planed down ⅛th inch on each side, would prove quite as strong per square inch as before.

Mr. James Nasmyth said he had tried a careful experiment on that very point: he cast some bars 2¼ inches square, and planed some of them down on each side to 2 inches square, and he found that these were 10 per cent. weaker for the proportionate transverse breaking strength. These bars were green sand castings, and consequently partially chilled: loam castings would not probably shew the same effect: he considered the effect of chilling was to increase the strength.

Mr. Slate said he had made a somewhat similar trial, though not so careful an experiment, and he did not perceive any difference in the strength of the skin.

Mr. May observed, that ⅛th inch on every side might be too

much to remove for ascertaining the relative strength of the skin alone, as the interior of a large bar was not so strong. It had been ascertained by the experiments of the Government Commissioners, that a cast-iron bar three inches square, was only $\frac{2}{3}$rds the proportionate strength of a bar one inch square, as the centre of the bar became less solid in cooling; consequently, a bar one inch square, cut out of the centre of a three-inch bar, would be considerably weaker than a bar cast one inch square; and not from the circumstance of the skin being removed, but from the iron being less solid. If only about $\frac{1}{50}$ inch were planed off a bar, it would remove the skin, but he thought the strength would be found not to be injured.

Mr. J. Nasmyth considered the skin effect extended more than $\frac{1}{8}$th inch deep,—at least the chilling was perceptible so far.

Mr. G. England remarked, that if the less dense part of a solid axle at the centre were taken out by boring, the axle would not be proportionately diminished in strength; and this was in effect done in the hollow axle, with the additional advantage of the internal pressure making the iron as sound throughout as in a thin bar, and considerably sounder and stronger than it could be in a large bar or shaft.

The Chairman said, it was certainly much easier to make a bar 1 inch thick, of good quality, and fibrous throughout, than one 3 or $3\frac{1}{2}$ inches thick; and, in effect, the hollow axle was a bar less than an inch thick throughout, in place of the ordinary solid axle, $3\frac{1}{2}$ or 4 inches thick.

Mr. McConnell thought it had to be defined what was meant by the term skin: in forging any bar, it became denser gradually at the surface, and consequently stronger—the effect penetrating to a greater or less depth, according to the circumstances; and it was that he referred to, not a mere film on the surface.

Mr. Slate remarked, that in reference to the crystallization produced in iron by concussion, he thought the effect did not take place, unless the strain was beyond the elastic limit more than five or six tons per inch, so as to cause a permanent change in the arrangement of the particles of the iron. He had tried an experiment in connection with Mr. Wild, in which a weight was suspended by a bar an inch square, and was lifted up and down, eighty times per minute, by an excentric, worked by a steam-engine, constantly, night and day: this was continued for a length of time, that was supposed equivalent to the effect of twenty-five years' work, but no change or crystallization in the iron was perceived.

Mr. McConnell observed, that whatever was the nature of the strain, and the change produced by concussion, the effect of the continued blows and concussion to which a railway axle was subjected, must be greatly diminished when the axle had a large hollow through the centre, instead of being entirely solid; as the effect of a blow on one side would be mostly lost in the vacant

space of the centre, instead of being all communicated through the mass of the axle. He shewed specimens of a hollow and a solid axle, which had been run hot for two hours, without oil, in a lathe, at a speed corresponding to about 20 miles an hour travelling: the solid journal broke off with 179 blows, quite short and crystalline; but the hollow journal would not break transversely, and split longitudinally in several places with 400 blows, and did not appear injured.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Cases in which a full Specification has been deposited.*]

2190. James Baldwin, of Birmingham, for improvements in the making of paper bags.—[*Dated September 22nd.*]
2209. Charles Frederick Stansbury, of Cornhill, for a new and useful method of converting fine coal into solid lumps.—[*Dated September 26th.*]
2215. Nicholas Callan, of the R. C. College, Maynooth, for a new mode of protecting iron of every kind against the action of the weather, of rain, river, spring, and sea-water, so that iron thus protected may be used for roofing, for cisterns, pipes, gutters, window-frames, telegraphic wires, for marine and various other purposes.—[*Dated September 27th.*]
2230. Henry Jeremiah Iliffe, James Newman, and Henry Jenkins, all of Birmingham, for improvements in the manufacture of buttons.—[*Dated September 29th.*]
2241. Caleb Bloomer, of Gold's-hill, West Bromwich, for improvements in the manufacture of anchors.—[*Dated Oct. 1st.*]
2340. Nicolas Callan, of the R. C. College of Maynooth, for a means of protecting iron of every kind against the action of the weather and of various corroding substances; so that iron thus protected will answer for roofing, cisterns, baths, gutters, pipes, window frames, telegraphic wires for marine and various other purposes.—[*Dated October 12th.*]
2363. Théodore Benoit Warée, of Paris, for certain improvements in apparatus for measuring the pressure of air, steam, gas, and liquids.—[*Dated October 13th.*]
2380. Auguste Edouard Loradoux Bellford, of Castle-street, for certain improvements in the treatment of copper ores,—being a communication.
2381. Charles Joseph Louis Cloux, jun., in the Empire of France, for a process for the preparation of hemp, after the stripping.
2385. Antoine Corvi, of Paris, for improvements to stationary and portable organs, with keys and cylinder.

The above bear date October 15th.

[*Cases in which a Provisional Specification has been deposited.*]

1281. William Bauer, of Munich, for improvements in the construction of vessels to be used chiefly at various depths under the surface of the water, and in machinery or apparatus connected therewith, for propelling, balancing, and steering the same, and for carrying on operations of various kinds on or under the surface of the water from within, upon objects without such vessels.—[*Dated May 25th.*]

1585. John Getty, of Liverpool, for certain improvements in shipbuilding.—[*Dated July 1st.*]

1651. Felix Lieven Bauwens, of Pimlico, for improvements in the manufacture of candles.—[*Dated July 11th.*]

1807. Mead Terry Raymond, of Clement's-lane, for improvements in apparatus for retarding and stopping trains of carriages on railways.—[*Dated August 2nd.*]

1864. William Edward Newton, of the Office for Patents, Chancery-lane, for an improved preparation or composition, to be applied to pigments for the purpose of facilitating the drying of the same,—being a communication.—[*Dated August 10th.*]

1948. William Vaughan, of Stockport, and John Scattergood, of Heaton Norris, for certain improvements in machinery, apparatus, or implements for weaving.—[*Dated August 20th.*]

1962. Thomas Herbert, and Edward Whitaker, both of Nottingham, for improvements in warp machinery employed in the manufacture of purled and other fabrics.—[*Dated Aug. 23rd.*]

2071. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in lighting for consuming the carbon escaping combustion in ordinary flames,—being a communication.

2073. Philip Grant, of Manchester, and John Doherty, of the same place, for improvements in the mode or method of cutting and finishing brass-rule and wood reglet, used in the art or process of letter-press printing and other similar purposes, and in the machinery or apparatus employed therein.

2075. Edwin Lumby, and Zacchœus Sugden, of Halifax, for improvements in needles or wires, used in the manufacture of carpets, looped pile fabrics, and velvets.

2077. James Martin, of Faversham, for improvements in locks.

2079. Isaac Lowthian Bell, of The Washington Chemical Works, Newcastle-upon-Tyne, for improvements in the manufacture of sulphuric acid.

2081. Cyprien Marie Tessié du Motay, and Edmond Louis Duflos, of Paris, for improvements in the mode of bleaching fibrous and other substances.

2083. James Childs, of Gilston-road, Brompton, for improvements in the manufacture of materials to render them suitable as substitutes for millboard and such like uses.

2085. Ernest Alexandre Gouin, of Avenue de Clichy, Paris, for

improvements in looms or weaving machines, applicable to the weaving of cotton, silk, flax, hemp, wool, or any other fibrous substances; by means of which improvements the warp-threads are unwound more regularly from the warp-roller, and the cloth or tissue taken up with more regularity, at the same time without straining the warp-thread; and by means of a peculiar motion in releasing the tension on the warp-thread, he is enabled to give an elastic or back-motion to the warp, which permits of all inelastic fibrous substances to be woven upon the power-loom; and, in case the weft-thread should break, the loom can continue in motion without the cloth-roller continuing to take up, or without detriment to the tissue.

2087. Robert Drew, of Bath, and John Bayliss, of Birmingham, for improvements in stay and other like fastenings.

The above bear date September 9th.

2088. William Charlton Forster, of Hatton-garden, for an improved manure.

2089. Arthur Warner, of Dorset-place, for the application of the fibrous part of the palm-tree and leaf to arts and manufactures.

2090. John Dickenson Brunton, of Truro, for an improved apparatus for separating gold or silver from their ores or other matters by amalgamation.

2091. Stopford Thomas Jones, of Trigon-terrace, Clapham-road, for improvements in propelling floating vessels, and in the mode of applying the propellers.

2092. John Grist, of Islington, for an improved stave-jointing or shaping machine.

2093. Edwin Scragg, of Buglawton, Cheshire, for improvements in steam-engines.

2094. Edmund Leyland, of St. Helen's, Lancashire, for improvements in apparatus for the manufacture of sulphuric acid.

2095. Thomas William Gilbert, of Limehouse, for improvements in sewing sails and other articles.

2096. Charles Jacob, of Ingram-court, Fenchurch-street, for improvements in the manufacture of lime.

2097. Robert Tronson, of the Chamber of Commerce, Liverpool, for improvements in ventilating and preventing spontaneous combustion in ships and other vessels laden with coal, culm, or cinders.

2098. Thomas Metcalfe, of High-street, Camden Town, for improvements in portable chairs and tables.

2099. John Webster, of Ipswich, for improvements in the treatment of fatty and oily matters, to render them suitable for the manufacture of candles.

2100. John Ward, of Saville-house, Leicester-square, and Edward Cawley, of Stanley-street, Chelsea, for improvements in chairs, couches, and tables.

2101. Joseph Marks and John Howarth, of Massachusetts, for

certain new and useful improvements in machinery or apparatus for operating the brakes of a train of railway carriages.

2102. Jules François Chack, of Castle-street, for improvements in machinery for cutting veneers,—being a communication.

The above bear date September 10*th.*

2103. William Weild, of Manchester, for improvements in lathes, and in apparatus connected therewith, for cutting, turning, or boring wood, metal, or other substances.

2104. John Wright Child, of Halifax, and Robert Wilson, of Low Moor Iron Works, for improvements in valves and pistons.

2105. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the transmission of motive power,—being an improved substitute for the crank,—a communication.

2106. Edward Rush Turner, of St. Peter's Foundry, Ipswich, for improvements in grinding-mills for farm and other purposes.

2107. John Lilley, jun., of Jamaica-terrace, Limehouse, for improvements in mariners' compasses.

2108. Joseph Maudslay, of Lambeth, for improvements in boilers and furnaces for generating steam.

2109. John Robison, of Coleman-street, and William Jackson, of Leman-street, for improvements in furnaces for effecting the consumption of smoke.

2110. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of printing blocks and cylinders,—being a communication.

2111. Louis Achille Brocot, of Paris, for an improved construction of astronomical calendar.

2112. Charles Cannon, of Dance-street, Liverpool, for improved machinery for obtaining motive power.

2113. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improved machinery for crushing and grinding mineral and other substances,—being a communication.

The above bear date September 12*th.*

2114. Thomas Henry Ewbank, of South-square, Gray's-inn, for improvements in the manufacture of terry or looped fabrics, and in machinery for producing the same.

2115. Charles Frederick Adams and William Gee, of Middle-street, Cloth Fair, and George Davis of Bath-street, Newgate-street, for the application of the processes of lithographic and zincographic printing of words, patterns, designs, and marks on metal, glass, wood, and other hard and unyielding substances in sheets, slabs, or flat pieces, with or without the intervention of paper or other flexible material.

2116. Henry Dubs, of Vulcan Foundry, near Warrington, for improvements in the method of forging or manufacturing iron and steel.

2117. Adolphus Sington, of Manchester, for certain improve-

ments in machinery or apparatus for grinding or setting doctors, used in calico and other similar printing machinery,—being a communication.

2118. Alexander Allan, of Crewe, for improvements in locomotive and other boilers for generating steam.

2119. James Hill Dickson, of Evelyn-street, Lower-road, Deptford, for improvements in machinery or apparatus for the preparation of flax and similar fibrous material.

2120. Jacob Behrens, of Bradford, Yorkshire, for improvements in the manufacture of zinc,—being a communication.

2121. William Smith, of Little Woolstone, Bucks, for improvements in implements for tilling and preparing land for crops.

2122. Emerson Goddard, of New York, for improvements in machinery for cutting stone.

2123. Moses Poole, of the Avenue-road, Regent's-park, for improvements in apparatus and means for removing matters or heat from currents of air, gases, or vapours, or from liquids, and for communicating matters or heat to the same,—being a communication.

2124. Richard Laming, of Millwall, Poplar, for an improved process for purifying gas.

The above bear date September 13th.

2125. John Wakefield, and James Baskerville, both of Inchicore Works, Dublin, for improvements in, and applicable to, valves for reciprocating engines driven by steam or other elastic fluid.

2126. John Wilson, of Manchester, for improvements in, and applicable to, machines for printing fabrics.

2127. Philip Webley, of Birmingham, for improvements in repeating pistols and other fire-arms.

2128. John Timmis, of Stafford, for improvements in safety-valves for boilers.

2129. Alexander Wallace and George Galloway, both of Glasgow, for improvements in the construction of portable articles of furniture.

2130. John Jonathan George Collins, of Philadelphia, for certain improvements in steam-engines.

2131. John Henry Johnson, of Lincoln's-inn-fields, for improvements in sewing-machines,—being a communication.

2132. James Higgin, of Manchester, for improvements in burning certain fluids for the purpose of obtaining heat.

2133. Charles Townsend Hook, of Tovil House, Maidstone, for improvements in the manufacture of pulp.

2134. Richard Dugdale Kay, of Bank-terrace, Accrington, for improvements in block printing.

2135. Moses Poole, of Avenue-road, Regent's-park, for improvements in machinery for separating flour shorts and dustings from bran as it comes from the bolting apparatus,—being a communication.

2136. George Spencer, of Cannon-street West, for improvements in supporting rails of railways.
2137. Jacob Behrens, of Bradford, Yorkshire, for improvements in generating steam in steam-boilers,—being a communication.
2138. Thomas Swingler, of Victoria Foundry, Litchchurch, for improvements in the permanent way of railways.
2139. William Nash, of Burslem, for an improved mode of manufacturing china and earthenware articles on the lathe.

The above bear date September 14th.

2140. Charles White, of Pimlico, for improvements in the blocks for block printing.
2141. Eliezer Edwards, of Birmingham, for a new or improved gas stove.
2142. Thomas Browning, of Pendleton, for improvements in machinery or apparatus for washing, scouring, or cleansing woven fabrics, either with plain or pile surfaces.
2143. Henry Kraut, of Zürich, for improvements in tools or implements to be used for boring or cutting rock or other hard substances for the purpose of blasting.
2144. Thomas William Keates, of Chatham-place, Blackfriars, for improvements in the distillation of turpentine and other resinous substances, and their products.
2145. Harvey Hilliard, of Glasgow, for improvements in apparatus for cleaning table cutlery.
2146. Ludwig Frederick Hermann Christoph Knuth, of the Old Bailey, for improvements in the manufacture of purses, cigar-cases, reticules, bags, tobacco pouches, and other similar articles.
2147. Henry Jeanneret, of Great Titchfield-street, for improvements in machinery for digging and tilling land.
2148. Moses Poole, of Avenue-road, for improvements in distributing printers' type,—being a communication.
2149. Sydney Smith, of Hyson Green Works, near Nottingham, for improvements in governors for steam-engines.
2150. John Barsham, of Kingston-upon-Thames, for improvements in the manufacture of bricks, tiles, and blocks.

The above bear date September 15th.

2151. Francis Higginson, of King William-street, for effecting certain improvements in the means of setting in motion and propelling ships, vessels, and boats of every description, upon seas, rivers, canals, and inland waters.
2152. David Mushet, of Coleford, Gloucestershire, for improvements in steam-engine boiler and other furnaces.
2153. William Shelbourne Icely, of Bromley, Middlesex, for improvements in mechanical telegraphs.
2154. Henry Meyer, of Manchester, for improvements in looms for weaving.
2155. William Carron, of Birmingham, for an improvement or improvements in signalling or communicating intelligence.

2157. Andrew Barclay, of Kilmarnock, for improvements in arranging and working mining engines.
2158. Andrew Barclay, of Kilmarnock, for improvements in lubricating shafts or revolving metallic surfaces.
2159. Alexander Thomson and David Lockerbie, both of Glasgow, for improvements in kilns for baking and burning articles in earthenware.
2160. John Adcock, of Marlborough-road, Dalston, for an improved apparatus for measuring the distance travelled by vehicles.
2161. Baldwin Fulford Weatherdon, of Chancery-lane, and Matthew Slade Hooper, of Sydenham, for certain improvements in railway signals.

The above bear date September 16th.

2162. Thomas Edwards Lilly, of Birmingham, for improvements in certain kinds of carriages.
2163. Arthur John Baker, of Burton-crescent, for strengthening vessels of timber and iron.
2164. Jonathan Burton, of Crawshaw-Booth, Lancashire, for improvements in shuttles for weaving; the whole or part of which are applicable to skewers used in winding and reeling machines.
2165. Richard Litherland, of Liverpool, and Thomas Picton, of Toxteth Park, near Liverpool, for an improved mode of manufacturing brushes, and in machinery for applying the same to the purposes of polishing and cleaning.
2166. Christopher Nickels and Ralph Selby, both of York-road, Lambeth, for improvements in the manufacture of flexible tubes and bands, and in covering wire.
2167. Henry Constantine Jennings, of Great Tower-street, for improvements in treating and bleaching resinous substances.
2168. Baron Henry De Bode, of Albert-street, Camden-road, for improvements in the manufacture of wheels.
2169. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of soap and saponaceous compounds, —being a communication.

The above bear date September 17th.

2170. Edward Thomas, of Belfast, for an improvement in the construction of looms for weaving.
2171. Charles Collins, of Hartford, Connecticut, U. S., for the manufacture by machinery of tubes from leather or other suitable flexible substance, chiefly for covering the drawing rolls of spinning machinery, but also applicable to other purposes.—
2172. William Lamphier Anderson, of Norwood, for improvements in propelling ships and other vessels.
2173. John Stephens, of Richmond, for improvements in obtaining motive power by the aid of air, steam, and other expansive gases.

2174. Thomas Restell, of the Strand, for improvements in opening and closing ventilating louvres.

The above bear date September 19*th.*

2175. Samuel Walker, jun., of Birmingham, for new or improved machinery for manufacturing thimbles.

2176. Robert Fletcher and John Smith, both of Birmingham, for improvements in fire-arms and discharging the same.

2177. Henry Walker, of Gresham-street, for improvements in the modes or means of stopping or retarding vehicles used on railways.

2178. John Louis Beloud, Samuel Camile Beloud, and George Guyatt, all of Greek-street, Soho, for improvements in shears.

2179. Aristide Michel Servan, of Philpot-lane, for improvements in distilling fatty and oily matters.

2180. Moses Poole, of Avenue-road, for improvements in life-preservers,—being a communication.

2181. Ferdinand Potts, of Birmingham, for improvements in the manufacture of taper tubes and in the apparatus connected therewith.

2182. William Stockil, of Long-lane, for a new or improved method of blocking leather used in the manufacture of boots.

2183. Stephen Neal, of Manchester, William Blanchard Jerrold, of the Inner Temple, and Conrad Montgomery, of Cornhill, for improvements in machinery for the manufacture of casks and barrels,—being a communication.

2184. Henry Needham, of Wardour-street, for improvements in revolving fire-arms.

2185. Joseph Gibbs, of Abingdon-street, for improvements in the treatment of minerals for the purpose of separating impurities therefrom.

The above bear date September 20*th.*

2186. George Peabody, of Warnford-court, for improved machinery for dressing and warping yarns,—being a communication.

2187. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved method of forming seams and ornamental stitching, and in machinery for effecting such operation; part of which machinery is applicable to the forming of other seams and stitches,—being a communication.

2188. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved mode of constructing steam-boilers; applicable also in part to the construction of condensers,—being a communication.

The above bear date September 21*st.*

2189. Thomas Smedley, of Holywell, Flintshire, for an improved railway train signal, communicating between the guard and engine-driver.

2191. Frederick Crace Calvert, of Manchester, for certain improved processes for separating emery from other matters.
2192. Peter Rothwell Arrowsmith and James Newhouse, both of Bolton-le-Moors, for certain improvements in machines for spinning and doubling.
2193. Edward Oldfield, of Salford, for certain improvements in machinery for spinning and doubling.
2194. Thomas West Walker, of Hanley, for certain improvements in the manufacture of crates made of wood for the use of potters.
2195. George White, of Laurence Pountney-lane, for an improvement in paddle-wheels.
2196. Samuel Alexander Benetfink, of Cheapside, for an improved construction of coal-box.

The above bear date September 22nd.

2197. James Leetch, of Birmingham, for an improved method of constructing breech loading fire-arms.
2198. Charles Alexander, of Albany-road, Camberwell, for a certain manner of preparing marquetry and all other kinds of inlaid work, in veneers of various thicknesses; and for fixing the same to walls and ceilings of whatever kind, and in or upon floors of wood, stone, or metal; and for rendering such floors water and fireproof.
2199. Auguste Edouard Loradoux Bellford, of Castle-street, for the application of the extract of the pine and other trees of the fir tribe to dyeing and coloring purposes,—a communication.
2200. Robert Varvill, of High Ousegate, York, for an improved mortising machine.
2201. William Dantec, of New Quay, Liverpool, for improvements in purifying water.

The above bear date September 23rd.

2202. James Grafton Jones, of Islington, for certain improvements in the means of conveying signals or intelligence from one part of a railway train to another.
2203. Hiram Tucker, of Massachusetts, U. S., for a new and useful improvement in the art or process of applying colors to a surface by means of a liquid.
2204. Alexander Dalgety, of Florence-road, Deptford, for improvements in lathes.
2205. William Farmer, of Fulham Brewery, for improvements in apparatus for preserving provisions.
2206. Charles Edward Austin, of Rookwoods, Stroud, for an improved reaping, gathering, and binding machine.
2207. Charles Maitland, of Alloa, and William Gorrie, of Rosemains, Midlothian, for improvements in apparatus for heating water or other liquids.

The above bear date September 24th.

2208. James Smith, of Law-hill, Perthshire, for improvements in scythes.

2210. Joseph Ellisdon, of London, for improvements in chairs, whereby they are rendered more portable, and can be converted into other useful articles of household furniture.

2211. Henry Winter, of Castle-street, for an improvement in trousers to supersede the use of braces; which improvement is applicable to other articles of apparel.

2212. William Adolphus Biddell, of Great Sutton-street, for improvements in alarums and signals, to be used in or on railways, ships, houses, buildings, plantations, or other places, for the purpose of giving audible or visible signal in cases of danger or alarm.

2213. Francis Frederick Clossman, of Park-lane, for the production and application of certain materials to be employed in the manufacture of textile fabrics, and for other purposes.

The above bear date September 26th.

2214. Robert Popple, of Beverley, for improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2216. William Prior Sharp, John Hill, the younger, and William Martin, all of Manchester, for improvements in machinery for spinning and doubling cotton and other fibrous substances.

2217. Isaac Bury, of Lower Mosley-street, Manchester, and William Green, of Islington, for improvements in treating, stretching, or finishing textile fabrics, and in machinery or apparatus for effecting the same.

2218. Robert Brisco, of Low Mill House, Saint Bees, Cumberland, and Peter Swires Horsman, of Saint John's, Beckermet, in the same county, for certain improvements in the preparation of flax and other vegetable fibrous substances.

The above bear date September 27th.

2219. Moses Poole, of Avenue-road, for improvements in the manufacture of pulp for paper makers,—being a communication.

2220. Louis Dominique Girard, of Paris, for certain improvements in hydraulic engines.

2221. John Barsham, of Kingston-upon-Thames, for improvements in the manufacture of bricks, tiles, and blocks.

2222. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for cutting paper,—being a communication.

2223. William Hickson, of Carlisle, for improvements in machinery for the manufacture and packing of bread or biscuits.

2224. Joseph Fermont Van Waesberghe, of Lokeren, Belgium, for the improved manufacture of artificial vinegar.

2225. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improved machinery for cutting metal or other substances,—being a communication.

2226. Thomas Askie, of Little Britain, for improvements in the construction of churns; which improvements are also applicable to other agitating or stirring apparatus.
2227. Jean Alexandre Labat, junior, of Bordeaux, for an improved system of stoppering vessels and bottles.
2228. Michel Ovide Bernard Lesage, of Paris, for certain improvements in hydraulic engines.

The above bear date September 28th.

2229. John Phillips, of Birmingham, for improvements in shaping metals.
2231. François Julien Raux, of Montmartre, for improvements in railway brakes.
2232. James Griffiths, of Wolverhampton, for certain improvements in steam-engines.
2233. Thomas William Kennard, of Duke-street, Adelphi, for improvements in constructing piers and foundations under water.
2234. Hiram Berdan, of New York, for a machine for collecting, preserving, and thereby preventing the loss of mercury, in the process of amalgamating metals, and for the more perfect and economical washing, separating, and amalgamating of auriferous and other ores.

The above bear date September 29th.

2235. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in treating certain exotic plants for the production of a fibrous substance, known in commerce by the name of vegetable silk,—being a communication.
2236. James Willis, of Wallingford, for improvements in gig harness.
2237. John Henry Johnson, of Lincoln's-inn-fields, for improvements in apparatus for throwing out ropes or lines, for the better preservation of life and property,—being a communication.
2238. John Plant, of Beswick, for improvements in the manufacture of textile fabrics.
2239. Robert Brisco, of Low Mill House, Saint Bees, Cumberland, and Peter Swires Horsman, of Saint John's, Beckermet, Cumberland, for certain improvements in machinery for heckling flax, hemp, China grass, and other fibrous substances.
2240. John Taylor, of Princes-square, for an improvement in the treatment or preparation of skins,—being a communication.

The above bear date September 30th.

2243. John Summerscales, and Benjamin Bancroft, both of Keighley, for improvements in shuttles employed in weaving textile fabrics.
2245. Thomas Woodcock, of Pulteney-terrace, Islington, for improved machinery for carving, cutting, chiselling, and engraving.

2247. Jean Marie Letestu, of Paris, for certain improvements in propelling ships and vessels.

2249. Isaac Ambler, of Manningham, near Bradford, for improvements in preparing or combing wool and other fibrous substances.

2251. Robert Halliwell, of Bolton-le-Moors, and William Johnson, of Farnworth, for improvements in machinery for spinning and doubling cotton and other fibrous substances, and for grinding-cards.

The above bear date October 1st.

2253. Michael Dwyer, of Woolwich, and James Brown, of Bridge-terrace, Mile-End, for an improvement in anchors.

2255. William Joseph Thompson, of North Shields, for improvements in heating reverberatory and other furnaces,—being a communication.

2257. James Leadbetter, of Halifax, York, and William Wight, of the same place, for improvements in machinery or apparatus for raising fluid and solid substances.

2259. Alfred Stanistreet Jee, of John-street, Adelphi, for improvements in the construction of rails for railways.

The above bear date October 3rd.

2261. Peter Rothwell Jackson, of Salford, for improvements in machinery for manufacturing hoops and wheels.

2263. Henry Jacob Jordan, of Berners-street, for an improved medicine for the cure of venereal affections, which he denominates "the Treisemar,"—being a communication.

2265. William Crofts, of Derby-terrace, Nottingham-park, for improvements in weaving.

2267. Nevil Smart, of Merton, for improvements in the manufacture of bricks.

2269. William Gossage, of Widnes, for improvements in obtaining certain saline compounds from solutions containing such compounds.

The above bear date October 4th.

2271. Joseph Holmes, of Portsea, for improvements in soldiers' or mess canteens, and other articles for containing food.

2273. John Wright, of Rochester, for improvements in apparatus to facilitate the landing and embarking of passengers from steam-boats and other vessels.

2275. Henry John Betjeman, of New Oxford-street, for improvements in apparatus for fixing capsules on the necks of bottles and other vessels.

2277. Samuel Leake Worth, of Oxford-street, and Agmond Dishin Vesey Canavan, of Fitzroy-street, for an improved polishing and brightening surface.

2279. John Mason, of Rochdale, for improvements in preparing cotton for spinning, and in machinery or apparatus for effecting the same.

The above bear date October 5th.

2281. John Milner, of Stratford, for improvements in steam-engines.
2283. Joseph Henry Cary, of Norwich, for an improved pianoforte action for upright pianofortes.
2285. Manuel Fernandez De Castro, of Madrid, for improved means of preventing accidents on railways.
2287. Henry Goddard, of Castle Gate, Nottingham, for improvements in stoves and kitchen ranges.
2289. John Rubery, of Birmingham, for improvements in the manufacture of umbrella and parasol furniture,—being a communication.

The above bear date October 6th.

2291. George Ellins, of Droitwich, for new or improved machinery for thrashing or separating the stem and husk from the grain or seed of wheat, barley, flax, and other plants.
2293. James Bullough, of Accrington, and John Walmsley and David Whittaker, of Blackburn, for improvements in machinery or apparatus for warping and sizing or otherwise preparing yarns or warps to be woven.
2295. John Henry Johnson, of Lincoln's-inn-fields, for improvements in apparatus for compressing or rarefying air or other elastic fluids,—being a communication.
2299. Thomas Lambert, of Short-street, New-cut, for improvements in ships' water-closets.
2301. Francis Whitehead, of Crayford, and William Whitehead, of the same place, for improvements applicable to lanterns, lamps, lamp shades, and reflectors for reflecting, concentrating, or diffusing light.

The above bear date October 7th.

2305. Joseph Denton, of Prestwich, Manchester, for improvements in looms for weaving.
2307. William Wilkinson, of Nottingham, for improvements in protecting telegraph wires.
2309. William Potts, of Birmingham, for improvements in mantelpieces.
2311. Charles May and James Samuel, both of Great-George-street, for improvements in joining the ends of the rails of railways.
2313. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in fire-arms and cartridges,—being a communication.

The above bear date October 8th.

2315. Henry Rawson, of Leicester, and Thomas Whitehead, of the same place, for improvements in regulating the flow of air to steam-boiler furnaces.
2317. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in the manufacture of candles and night-lights.

2319. Frederick Warner and John Shotton, both of the Crescent, Jewin-street, for improvements in the manufacture of large bells.

2321. Hugh Lee Pattinson, of Scot's House, near Gateshead, for improvements in the manufacture of sulphuric acid.

The above bear date October 10th.

2323. Henry Kemp, of Barkham-terrace, Southwark, for certain improvements in the preparation of wood for sheathing ships, as a substitute for copper and other metals; also in house, ship, and pier building, &c., &c.

2325. Louis Alexandre Farjon Demoulin, of Rue Sedaine, Paris, for improved apparatus applicable to carriages on common roads for the prevention of accidents, and increasing the power of locomotion.

2327. David Dick, of Paisley, for improvements in the manufacture of flexible tubes or pipes.

2329. James Worrall jun., of Salford, for certain improvements in the method of dyeing fustians and other textile fabrics, and in the machinery or apparatus connected therewith.

2331. James Hall Nalder, of Alvescott, and John Thomas Knapp, of Clanfield, for improvements in winnowing or dressing corn.

2333. James Harris, of Hanwell, for improvements in apparatus for heating water and other fluids.

2335. James Webster, of Leicester, for improvements in water-gauges for steam-boilers.

2337. Bernard Couvan, of Fenchurch-street, for improvements in giving signals on railways.

The above bear date October 11th.

List of Patents

Granted for SCOTLAND, from the 22nd August to the 22nd October, 1853.

To John Ramsden, of Manchester, screw bolt manufacturer, for improvements in machinery or apparatus for cutting screws.—Sealed 29th August.

Thomas Dawson, of 14, Melton-street, Euston-square, London, for an improved method of constructing umbrellas and parasols.—Sealed 5th September.

James Ansel, of Shadwell, engineer, for certain improvements in obtaining and applying motive power, and also in pumps.—Sealed 30th September.

Joseph Gibbs, of Devonshire-street, London, civil engineer, for improvements in the treatment of metals and metalliferous ores.—Sealed 12th October.

New Patents.

Sealed under Patent Law Amendment Act, 1853.

743. James Webley, of Birmingham, for improvements in the construction of repeating or revolving and other pistols and fire-arms.—March 29.
745. Thomas Hill, of Southampton, for certain improvements in springs, and also in the modes of their application to railway engines and carriages,—being a communication.—March 29.
748. Robert Heath, of Betley, Staffordshire, for improvements in railway breaks and signals.—March 29.
749. Isaac Rider, of Bristol, for improvements in cocks for drawing off beer or other liquids.—March 29.
750. Lawrence Frederick Keogh, of Liverpool, for improvements in looms for weaving.—March 29.
755. John Pym, of Pimlico, for improvements in the permanent way of railways.—March 29.
757. Julian Bernard, of Guildford-street, Russell-square, for certain improvements in boots, shoes, and clogs, and in the machinery or apparatus and materials connected therewith.—March 29.
769. Lot Faulkner, of Cheadle, for certain improvements in the method of obtaining motive power.—March 30.
772. Robert McGavin, of Glasgow, for improvements in the construction of ships' masts, yards, booms, and in spars.—Mar. 31.
774. John Radcliffe, of Bradford, Lancashire, for improvements in looms for weaving.—March 31.
781. Henry Spencer, Henry Tattersall, and Hugh Simphson, all of Rochdale, for certain improvements in machinery or apparatus for preparing and spinning cotton and other fibrous materials.—April 1.
786. Sir James Caleb Anderson, Bart., of Fermoy, Ireland, for improvements in locomotive engines.—April 2.
788. George Robb, of Glasgow, for improvements in the manufacture of sulphuric acid, alkalis, and other salts.—April 2.
791. Christopher Garman Rosenkilde, of Christiansand, Norway, for improvements in window sash-fastenings.—April 2.
792. Frederick William Mowbray, of Bradford, Yorkshire, for improvements in doubling wool and other fibrous substances.—April 2.
794. James Findlow, of Manchester, for improvements in beds or couches for sick persons.—April 4.
797. William Beckett Johnson, of Manchester, for improvements in steam-engines, and in apparatus connected therewith.—April 4.
800. George Henry Brockbank, of Crawley-street, Oakley-square, for improvements in horizontal piano-fortes.—April 4.

806. Antoine Burq, of Paris, for certain instruments, apparatus, and articles for the application of electro-galvanic and magnetic action for medical purposes.—April 4.

810. William Mavity, of Birmingham, for a new or improved method of manufacturing letters and figures, to be used as printing-type, lettering for sign and window-boards, and other such like purposes.—April 5.

817. William Pidding, of the Strand, for improvements in the manufacture of woven, textile, or other fabrics, and in the machinery or apparatus connected therewith.—April 5.

821. William Pidding, of the Strand, for improvements in the preparation or treatment of twine or other threads, or cuttings of paper or other waste, for the production of useful and ornamental articles.—April 5.

825. Henry Leachman, of Compton-terrace, Islington, for improvements in the manufacture of iron,—being a communication.—April 6.

832. William Augustus Pascal Aymard, of South-street, for certain improvements in the preparation for, and application to, the manufacture of candles, and other purposes, of certain fatty and resinous bodies or substances,—being a communication.—April 7.

833. William Morgan, of Birmingham, for improvements in paper and cardboard cutting machines.—April 7.

835. Frederick William Mowbray, of Bradford, for improvements in apparatus used in preparing and combing wool, and other fibrous materials.—April 7.

844. George Frederic Goble, of Great Fish-street-hill, for improvements in safety valves for steam boilers and gas chambers. —April 8.

847. George Humphrey, of Brighton, for an improved self-acting safety valve, for locomotive, marine, and other steam boilers. —April 8.

853. Joshua Farrar, of Marsden, for improvements in the treatment of flax, line, grasses, and other fibrous substances.— April 8.

854. Stephen Taylor, of New York, for improved machinery for weaving seamless goods,—being a communication.—April 8.

855. George Frederic Goble, of Fish-street-hill, for improvements in machinery to be actuated by water or air.—April 9.

862. Robert Bostwick Ruggles, of Paterson, State of New Jersey, and Lemuel Wright Serrell, of New York, for improvements in machinery for beating gold and other laminæ of metal.— April 9.

864. William Urquhart, of Great Queen-street, for improvements in the manufacture of printers' type, and other articles used in letter-press printing.—April 11.

865. William Russell Palmer, of Elizabeth City, North Carolina, for improvements in the construction and arrangement of ma-

chines for the application of horse-power, which he designates as "Palmer's improved horse-power."—April 11.

866. William Russell Palmer, of Elizabeth City, North Carolina, for improvements in machines for threshing seeds and grains, and for cleaning them from the straw and chaff after they are threshed, which he designates as "Palmer's American seed and grain thresher and winnower."—April 11.

869. Donald Nicoll, of Regent-street, for improvements in garments, and in sewing or uniting the seams of the same.—April 11.

870. Samuel Russell and Robert Murray McTurk, of Sheffield, for improvements in metallic handles for table cutlery, daggers, and such like instruments.—April 11.

871. Henry Blake, of Brighton, for improvements in railway-wheels.—April 11.

872. Richard Archibald Brooman, of Fleet-street, for improvements in grinding and pulverizing gums, gum-resins, and other drugs and articles of a similar character,—being a communication.—April 12.

875. James Taylor, of Carlisle, Isaac Brown, of the same place, and John Brown, of Oxford-street, for improvements in the manufacture or production of charred peat.—April 12.

881. Robert John Kaye, of Bury, and John Ormrod Openshaw, of Roach-mount, near Bury, for improvements in obtaining motive power by electro-magnetism.—April 12.

895. Charles Clifford, of Inner Temple-lane, for improvements in apparatus for lowering boats evenly and preventing them filling with water.—April 13.

899. Constant Jouffroy Duméry, of Paris, for improvements in the manufacture of paste and enamel buttons.—April 14.

901. John Chadwick, of Manchester, and Thomas Dickins, of Spring Vale Works, near Middleton, Lancashire, for improvements in the production of raw and thrown silk.—April 14.

902. John Bethell, of Parliament-street, for improvements in the manufacture of flax.—April 14.

914. François Marie Antoine Serruys, of Bruxelles, for improvements in tanning,—being a communication.—April 14.

916. George Titterton, of Margaret-street, Cavendish-square, for improvements in brushes.—April 14.

918. William Allen, of Westbourne-street, Pimlico, and William Murrell, of Grosvenor-road, Pimlico, for improvements in the mode or modes of cleansing bottles or other similar articles.—April 14.

920. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in treating refuse silk waste, and in converting it into a valuable product,—being a communication.—April 15.

922. Samuel Bayliss, of Old Broad-street, for improvements in consuming or preventing smoke and heating liquids.—April 16.

924. Jean Marie Souchon, of Paris, for improvements in the manufacture and purification of gas for illumination, and certain products therefrom, and in apparatus for that purpose.—April 16.
925. Joseph Cooke and William Cooke, both of Birmingham, for a new or improved machinery for cutting or shaping corks and bungs.—April 16.
926. George Albemarle Cator, of Selby, Yorkshire, for improvements in machinery for preparing flax, hemp, and other vegetable fibrous substances, for scutching, or other manufacturing processes.—April 16.
931. Richard Ford Sturges, of Birmingham, for a new or improved apparatus for making vegetable and other infusions and solutions.—April 18.
932. Joel Watts, of Dover Cottage, Sleaford-street, Battersea-fields, for improvements in the construction of pistons of steam and other engines; applicable also to force-pumps and lifting-pumps.—April 18.
933. William M'Naughton, of Aberdeen, for improvements in printing yarns or worsteds for weaving carpets; also in printing carpets, woollen, silk, cotton, and other textile fabrics or fibrous substances.—April 18.
938. François George Sicardo, of Marseilles, for a new rotary steam-engine.—April 19.
939. Thomas Newey, of Garbett-street, Birmingham, for improvements in fastenings for articles of dress.—April 19.
949. Andrew Blair, of Maryhill, Lanark, for improvements in propelling vessels.—April 19.
950. John Smethurst, of Manchester, for an improved plan for packing yarn and other materials.—April 20.
951. Samuel Weight, of Cheltenham, for improvements in ventilating mines, sewers, or drains, ships, buildings generally, and other localities.—April 20.
952. Emile Chappuis fils, of St. Mary Axe, for an improved apparatus for the diffusion of light, to be called the "myriastratic reflector."—April 20.
953. Henry McEvoy, of Birmingham, for certain improvements in the construction and manufacture of door bolts.—April 20.
955. Richard Archibald Brooman, of Fleet-street, for improvements in inhaling tubes,—being a communication.—April 20.
959. Thomas Dunn, of Windsor Bridge Iron Works, Pendleton, near Manchester, for certain improvements in and applicable to boilers or apparatus for generating steam, and in apparatus connected therewith.—April 21.
960. Charles Reeves, jun., of Birmingham, for an improvement or improvements in swords.—April 21.
963. James Petrie, of Rochdale, for certain improvements in steam-engines.—April 21.
964. Philip Harris, of Chatham, for certain improvements in fire-arms.—April 21.

965. William Robjohn, of Islington, for an improved meter for measuring and indicating the measure of liquids.—April 21.

975. Jerome André Drieu, of Bowden, Cheshire, for improvements for cutting the pile of velvet, velveteens, and other piled fabrics.—April 22.

976. Edward Onslow Aston and George Germaine, both of Millwall, for improvements in compositions for coating wood, metal, and other materials exposed to the action of sea water or the weather.—April 23.

986. Richard Johnson, of Manchester, for improvements in machinery or apparatus for drawing wire.—April 23.

987. Edward O'Connell, of Bury, Lancashire, for improvements in the mode or method of feeding infants and invalids, and in apparatus connected therewith.—April 25.

989. Charles Léon Desbordes, of Paris, for improvements in instruments for measuring the pressure and temperature of air, steam, and other fluids.—April 25.

990. John Chatterton, of Birmingham, for an improvement or improvements in covers for wagons, carts, and other vehicles.—April 25.

993. James Emery, of Preston, Lancashire, for improvements in the construction of gigs, dog-carts, and other vehicles.—April 25.

995. Julian Bernard, of Guildford-street, for improvements in casting metals, and in moulding or forming other materials.—April 25.

1005. William Johnson, of Farnworth, near Bolton-le-Moors, for improvements in machinery for preparing and spinning cotton and other fibrous substances.—April 27.

1006. Frederick George Underhay, of Well-street, Gray's-inn-road, for improvements in reaping and mowing machines.—April 27.

1015. William Johnson, of Lincoln'-inn-fields, for improvements in machinery or apparatus for marking, ruling, or ornamenting surfaces,—being a communication.—April 27.

1031. James Berry, of Horwich, near Bolton, and Thomas Booth, of Chorley, for improvements in machinery or apparatus for printing or staining woven fabrics and paper.—April 28.

1033. William Hurt Sitwell, of Sydenham, for improvements in projectiles for cannon and fire-arms.—April 28.

1034. Sir John Scott Lillie, of South-street, Finsbury, for improvements in roads, floors, footways, and other like surfaces.—April 28.

1043. Jacques Stanislas Vigoureux, of Reims, for certain improvements in the combing of wool and other fibrous materials.—April 29.

1045. Colin Mather, of Salford, for improvements in apparatus used in bleaching.—April 29.

1047. Oliver P. Drake, of Massachusetts, U.S., for a new or im-

proved apparatus for vaporizing benzole, or other suitable volatile hydro-carbon, and mixing it with atmospheric air, so that the mixture may be burnt for the purposes of illumination or otherwise.—April 29.

1049. James Bristow, of Bouverie-street, and Henry Attwood, of Holland-street, Blackfriars-road, for improvements in the means of consuming smoke.—April 29.

1064. François Monfrant, of Paris, for improvements in lubricating materials,—being a communication.—May 2.

1089. Thomas Masters, of Oxford-street, for improvements in apparatus for freezing, cooling, and churning.—May 4.

1122. William Longmaid and John Longmaid, both of Beaumont-square, for improvements in treating waste products obtained in smelting and otherwise treating ores and minerals, and in producing a valuable product or products therefrom.—May 6.

1135. John Fisher, of Liverpool, for improvements in machinery for propelling vessels, and in the mode of manufacturing the same.—May 9.

1149. George Roberton and Alexander Roberton, both of Bradford, Yorkshire, for improvements in apparatus for drying and finishing woven fabrics.—May 10.

1151. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery or apparatus for effecting agricultural operations,—being a communication.—May 10.

1156. Marie Pierre Ferdinand Mazier, of Aigle, France, for a machine for cutting and reaping corn, corn crops, and other plants.—May 11.

1159. Henry Potter Burt, of Charlotte-row, for improvements in portable houses.—May 11.

1187. Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, for improvements in steam-boilers.—May 13.

1236. Edward Briggs, of the Castleton Mills, near Rochdale, for improvements in the manufacture of pile fabrics, and in the machinery or apparatus employed therein.—May 18.

1245. Charles De Bergue, of Dowgate-hill, for improvements in the permanent way of railways, and also in chairs, and in sleepers for permanent way.—May 19.

1258. William Chisholm, of Holloway, for improvements in the purification of coal-gas for the purposes of illuminating and heating, and obtaining by the ingredients used therefor, manures, salts of ammonia, and sulphur.—May 21.

1293. Charles Cowper, of Southampton-buildings, for improvements in the manufacture of iron,—being a communication.—May 26.

1351. John Robert Johnson, of Stanbrook Cottage, Hammersmith, for improvements in the manufacture of type and articles used in letter-press printing.—June 2.

1353. Richard Longden Hattersley, of Keighley, for improvements in machinery for forging iron and other metals.—June 2.

1359. William Boyd, of Belfast, for improved apparatus for manufacturing chlorine or chlorides.—June 2.

1519. Juste Giret, of Paris, for certain improvements in artificial and malleable stones, and in the apparatus to be used for such purposes.—June 21.

1613. Thomas William Kennard, of Duke-street, Adelphi, for improvements in iron bridges.—July 6.

1623. John Knox Stuart, of Glasgow, for improvements in hats and other coverings for the head.—July 7.

1656. Andrew Burns, of Glasgow, for improvements in constructing iron ships, boats, boilers, and other metallic structures.—July 12.

1697. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in machinery or apparatus for digging, excavating, and removing earth,—a communication.—July 15.

1698. Edmund Reynolds Fayerman, of Shaftesbury-crescent, for a method of and instrument for keeping time in music.—July 16.

1709. Thomas Wood and George Wade, both of Sowerby Bridge, Yorkshire, for improvements in machinery or apparatus for opening, cleaning, carding, or otherwise preparing cotton, or other fibrous materials to be spun.—July 18.

1713. Richard Dart, of Bedford-street, Covent-garden, and Edward Silverwood, of the same place, for the adaptation of loom machinery to the purposes of embroidery for badges worn by the police, railway officials, and other officers, and which require a succession of figures.—July 19.

1734. Mary Ann Rylands, of Kingston-upon-Hull, for improvements in yards and spars of ships and other vessels,—being a communication.—July 22.

1738. Frederick Warner and John Lee, of the Crescent, Jewin-street, for improvements in water-closets and urinals.—July 23.

1740. James Murdoch Napier, of York-road, Lambeth, for improvements in letter-press and other raised surface printing machines.—July 23.

1747. Robert Bitten, of Dartford, for improvements in apparatus for ascertaining and indicating the supply of water in steam-boilers.—July 25.

1748. Warren de la Rue, of Bunhill-row, for means of treating and preparing certain tar or naphtha, and applying products thereof.—July 25.

1749. John Ferguson, of the Heathfield Brick and Pottery Works, Glasgow, for improvements in kilns for baking or burning clay.—July 25.

1750. Charles Frederick Spieker, of New York, for improvements in generating and fixing ammonia.—July 25.

1751. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery or apparatus for stopping cables,—being a communication.—July 25.

1752. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved manufacture of cutting tools,—being a communication.—July 25.
1753. John Dawson, of Linlithgow, Scotland, for a new instrument or apparatus for the purpose of preventing fraud in drawing off liquids.—July 26.
1759. Farnham Maxwell Lyte, of Florian, Torquay, for improvements in obtaining iodide of potassium when treating certain metals.—July 26.
1760. Joseph Barrans, of Peckham-lane, Deptford, for improvements in steam-boilers.—July 26.
1762. Lansing E. Hopkins, of New York, for the manufacture of hat-bodies of fur and other like substances.—July 26.
1763.—Alfred William Warder, of Sydney-street, Brompton, for improvements in gas-stoves.—July 26.
1764. Francis Arding, of Uxbridge, for improvements in threshing machines.—July 27.
1773. Theodore Dethier, of Pimlico, for an improved machine for mortising, drilling, and boring.—July 29.
1775. James Edward Mc Connell, of Wolverton, for improvements in steam-engines and boilers for marine purposes.—July 29.
1776. James Mackay, of Aigburth, near Liverpool, for improved apparatus for propelling vessels.—July 29.
1790. John Gray, of Rotherhithe, for improved apparatus for consuming smoke.—August 1.
1791. Philipp Schäfer and Frederick Schäfer, of Brewer-street, for an improvement in travelling bags.—August 1.
1795. Augustus Russell Pope, of Massachusetts, America, for a new and useful or improved electro-magnetic alarm apparatus, to be applied to a door or window, or both, of a dwelling-house or other building, for the purpose of giving an alarm in case of an attempt to open said door or window.—August 1.
1796. Robert Griffiths, of Mornington-road, Regent's-park, for improvements in the manufacture of rivets and bolts.—Aug. 1.
1797. Charles May, of Great George-street, Westminster, for improvements in the manufacture of bricks.—August 1.
1798. Richard Holme, of Kingston-upon-Hull, for improvements in the manufacture of gas.—August 1.
1814. Charles Frederick Stansbury, of Pall-mall, for certain improvements in machinery for tempering clay and pressing or converting it into bricks,—being a communication.—August 3.
1815. William Sargeant Roden and William Thomas, both of Ebbw Vale Iron Works, for improvements in rolling metals.—August 3.
1824. Richard Brown Roden, of Abersycham Iron Works, near Newport, Monmouthshire, for improvements in rolling iron and all other malleable metals and alloys.—August 4.

CELESTIAL PHENOMENA FOR NOVEMBER, 1853.

D.	H.	M.	
1			Clock after the ☉ 16m. 18s.
	—		☽ rises 6h. 46m. M.
	—		☽ passes mer. 11h. 54m. M.
	—		☽ sets 4h. 51m. A.
	8	39	Ecliptic conj. or ● new moon
2	4	41	☿ in conj. with the ☽ diff. of dec. 3. 32. S.
	6		☽ in Perigee
	13	50	♅ in oppo. to the ☉
3	9	31	♀ in conj. with ♃ diff. of dec. 2. 33. S.
	21	37	♃ in conj. with the ☽ diff. of dec. 1. 23. N.
	22	30	♀ in conj. with the ☽ diff. of dec. 1. 8. S.
5			Clock after the ☉ 16m. 16s.
	—		☽ rises 0h. 20m. A.
	—		☽ pass mer. 3h. 57m. A.
	—		☽ sets 7h. 34m. A.
8	0	12	☽ in □ or first quarter.
9	13	53	Pallas in conj. with ♃ diff. of dec. 29. 21. N.
10			Clock after the ☉ 15m. 55s.
	—		☽ rises 3h. 0m. A.
	—		☽ pass mer. 8h. 23m. M.
	—		☽ sets Morn.
11	7	4	☿ greatest Hel. Lat. S.
	17	53	♀ greatest Hel. Lat. S.
13			Ceres in conj. with ♀ diff. of dec. 2. 44. N.
14	2	4	♅ in conj. with the ☽ diff. of dec. 2. 25. N.
	21	42	☿ greatest elong. 22. 19. E.
15			Ceres in the descending node
	4	58	♃'s third sat. will em.
	5	20	♃'s first sat. will em.
	6		Ecliptic oppo. or ○ full moon
	17	20	♄ in conj. with the ☽ diff. of dec. 1. 15. S.
17			Occul. 121 Tauri, im. 17h. 23m. em. 18h. 29m.
	—		Mercury, R. A., 17h. 3m. dec. 25. 22. S.
	—		Venus, R. A., 18h. 44m. dec. 25. 46. S.
	—		Mars, R. A., 10h. 12m. dec. 13. 12. N.
	—		Vesta, R. A. 10h. 25m. dec. 13. 23. N.
17			Juno, R. A., 11h. 8m. dec. 0. 6. N.
	—		Pallas, R. A., 16h. 39m. dec. 4h. 27. N.
	—		Ceres, R. A., 16h. 52m. dec. 22. 36. S.
	—		Jupiter, R. A., 17h. 46m. dec. 23. 17. S.
	—		Saturn, R. A., 3h. 47m. dec. 17. 39. N.
	—		Uranus, R. A., 2h. 30m. dec. 14. 24. N.
	—		Mercury pass mer. 1h. 17m.
	—		Venus pass mer. 2h. 58m.
	—		Mars pass mer. 18h. 24m.
	—		Jupiter pass mer. 2h. 0m.
	—		Saturn pass mer. 11h. 59m.
	—		Uranus pass mer. 10h. 43m.
	14		☽ in Apogee.
20	4	25	♄ in oppo. to the ☉
	—		Clock after the ☉ 14m. 10s.
	—		☽ rises 7h. 23m. A.
	—		☽ passes mer. 3h. 11m. M.
	—		☽ sets 11h. 52m. A.
23			Occul. *i* Leonis, im. 10h. 15m. em. 10h. 59m.
	10	35	☽ in □ or last quarter
	11	19	♂ in conj. with the ☽ diff. of dec. 3. 22. S.
24	15	51	☿ stationary
25			Clock after the ☉ 12m. 47s.
	—		☽ rises 0h. 7m. M.
	—		☽ pass mer. 7h. 12m. M.
	—		☽ sets 2h. 1m. A.
26	4	51	♂ in □ with the ☉
28	1	33	Vesta in □ with the ☉
	22	28	Ceres in conj. with ☿ diff. of dec. 0. 4. N.
30			Clock after the ☉ 11m. 4s.
	—		☽ rises 7h. 9m. M.
	—		☽ pass mer. 11h. 30m. M.
	—		☽ sets 3h. 42m. A.
	—		☉ eclipsed. Invis. at Greenwich
	6	56	☿ in the ascending node.
	7	31	Ecliptic conj. or ● New Moon
	17		☽ in Perigee
	21	29	☿ in conj. with the ☽ diff. of dec. 0. 52. N.

J. LEWTHWAITE, Rotherhithe.

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No. CCLXIV.

RECENT PATENTS.

To Lewis Jennings, *of Fludyer-street, in the City of Westminster, mechanical engineer, for an improved apparatus for regulating the speed of machinery.*—[Sealed 2nd March, 1853.]

This invention relates to the regulating of the speed of motive power engines, and other machinery, by the rising and falling of a fan, screw or other analogous contrivance, which being mounted on a loose spindle, will, on receiving rotary motion, cleave the air, water, or other fluid in which it is immersed, and will rise or fall, or traverse the fluid, according to the speed by which it is driven.

In Plate XIII., fig. 1, shews, in side elevation, a governor, constructed upon this principle; and fig. 2, is a sectional elevation of the same. *a, a,* is a vessel containing water or other fluid; and from the bottom of this vessel to the cover a tube *b,* extends upwards, to receive a spindle *c,* which it supports in a vertical position. The lower extremity of this spindle *c,* rests in a step *d,* and its upper end turns in a bearing carried by a standard *a**, bolted to the top flange of the vessel *a.*

Rotary motion is given to the spindle *c,* by a bevil-wheel, on a shaft *e,* (connected with the motive-power machinery) taking into a bevil-wheel keyed to the spindle *c.* Over the fixed tube *b,* rides a loose hollow spindle *f,* which carries, at its lower end, a screw *g,* and, at its upper end, an excentric hollow double cone *h,* shewn in sectional plan, and on an enlarged scale, at fig. 3. The spindle *c,* is provided, at its

upper end, and at opposite sides thereof, with a feather-edge, for the purpose of taking into two grooves made through the hollow cone. When, therefore, rotary motion is communicated to the spindle *c*, the cone will be caused to revolve, and with it the screw *g*; which, by acting upon the liquid like a propeller, will have a tendency to rise therein and lift the hollow cone to a higher level. This cone terminates in a grooved ring, which is embraced by a strap-piece forming a portion of a lever *i*,—the weighting of which determines the resistance to be given to the upward movement of the screw *g*, and cone *h*, and, consequently, the amount of motion to be imparted to the throttle-valve of the engine, as will be presently explained. The weighted lever *i*, is carried by a fulcrum-pin *k*, which works in bearings carried by the standard *a**; and this lever is made to bear down the screw *g*, by pins which, projecting from the strap-piece of the lever, take into an annular groove formed in the periphery of the ring at the top of the cone *h*. *l*, is a vertical rock-shaft, supported in bearings from the standard *a**, and carrying two arms *m*, *m**, which are provided with antifriction bowles and embrace the double cone *h*, at opposite sides of its base, for the purpose to be presently explained. The arm *m*, is continued past the cone, and connected to the throttle-valve of the motive-power engine, for the purpose of governing the motions of that valve.

In working this improved governor it is necessary to keep the fluid in the vessel *a*, quiescent, or to prevent it from following the movement of the screw *g*. For this purpose vertical blades *n*, (radiating from a loose boss, which rests on the boss of the screw, and rises and falls therewith) are provided in the vessel *a*. These blades, which are intended to act as dash-boards, and prevent the liquid from attaining a circular motion, are secured from rotating by one of them being let into a vertical recess made in the side of the vessel *a*, (see the sectional plan of the vessel at fig. 4,) while, at the same time, the blades are free to rise and fall, and thus present no obstruction to the vertical movements of the screw.

The action of the governor is as follows:—Water or other fluid having been let into the vessel *a*, and rotary motion communicated through the shaft *c*, to the double cone *h*, the cone will, by reason of its irregularity or excentricity, bear against one or other of the bowles of the arms *m*, *m**, according to the position they have assumed with respect to the cone, and cause the arms to vibrate; which motion will be communicated to the throttle-valve, and regulate the supply of steam to the engine. Fig. 1, shews the double cone in its

medium position, at which it is to be set by weighting the lever *i*; so that it will present an amount of resistance equal to the tendency of the screw *g*, to press the cone above the medium position. It will now be understood, that when the speed of the driving power is slackened, the screw will sink in the liquid, and an increasing diameter of the cone will be brought into contact with the bowle of the arm *m*; by which means the valve will be opened wider, so as to allow of an increased supply of steam passing to the engine. On the contrary, when the speed of the driving power increases, the screw will rise in the liquid, and carry up the cone, so as to bring an increasing diameter thereof to bear against the bowle of the arm *m**; by which means the passage for the steam to the engine will be contracted, and the speed will consequently be reduced.

In applying the improved governor to increase or slacken the speed of any driven machinery, without changing the speed of the engine, which is the driving power, the arm *m*, is caused to act upon the forked lever, which commands the driving-band of the machine; and this band, being passed over pulleys, will, as it is shifted to an increasing or decreasing diameter of pulley, change the speed of the machine.

The patentee claims, First,—the general arrangement of parts, as above set forth, for regulating the speed of machinery. Secondly,—obtaining and applying the variable motion, for effecting the required regulation of speed in machinery, by means of a traversing-screw or other propeller, working in air or water or other liquid. Thirdly,—the use of the excentric or cam-cone, for imparting motion to the arm or lever of throttle-valves of engines, or to the driving-band or strap-lever of machinery generally.

To William Pope, *of Holford-square, Pentonville, in the county of Middlesex, engraver, for improvements in the ventilation of ships.*—[Sealed 4th November, 1852.]

The object of this invention is to effect a continuous circulation of air between the decks of steam and sailing vessels, and through the several cabins and other compartments of such vessels, without the aid of fans or other apparatus driven by steam or other motive power. The vessel is provided, at the head and stern, with a series of air-conductors; and, in connection with these, is a system of pipes, which pipes traverse the vessel in any convenient way, and give off the air supplied to them wherever it is required. Thus, for example;—in

ventilating a passenger ship, the floor of each sleeping cabin is fitted with a metallic or other box, having a lid pierced with numerous holes, or covered with a grating, and these boxes are connected with the system of ventilating pipes. A current of air being set up in these pipes, by the rapid progress of the vessel through the atmosphere, a continuous stream of fresh air may be supplied to each sleeping berth during the whole progress of the voyage. Escape passages for vitiated air may be made direct from the sleeping cabins to the open air, through the sides of the vessel; or this air may pass through ventilating slips in the partitions which cut off the berths from the main saloon, and be carried off thence through the deck, in the ordinary way, or through pipes fitted with a cowl, to assist its passage upwards. It is proposed to supply the saloon and other large cabins with fresh air in like manner, through any given number of gratings in the floor.

In Plate XIII., figs. 1 and 2, represent, in sectional elevation, the manner of ventilating a steam vessel, according to this invention. At the head of the vessel, converging in-draught air channels *a, a, a,* are formed, which lead by trunks *b, b,* to descending pipes *c, c;* and thus the air, which enters the channels *a, a,* is passed down below the lower deck. In order to distribute the air through the several compartments of the ship, where ventilation is required, the tubes *c, c,* are connected with a system of pipes *d, d,* which take the circuit of the ship; and to these pipes lateral branches are attached, for conducting the air to the several air-chests or boxes *f, f,* whence it issues out, to ventilate the various compartments of the vessel. The stern of the vessel is also provided with in-draught air channels, shewn at *g, g,* in fig. 2, which channels are connected with the pipes *d, d,* to assist in feeding them with air. Fig. 3, shews the manner of obtaining the stern in-draught. The bulwark at the stern of the vessel is fitted with a series of reticulated panels, composed (by preference) of ventilating slips, which are capable of being covered in, during bad weather, by sliding shutters. A similar means is employed at the poop for supplying the air pipes *d, d,* with air. The front of the poop deck is fitted with reticulated panels, which are composed of ventilating slips, both at their back and front sides. This arrangement is shewn at figs. 4. Between the slips is a vertical partition, which prevents the wind from blowing through the panels, and conducts the air down into the air pipes *d, d,* whence it passes, as before explained, into the boxes *f,* and so to the several cabins or other compartments of the vessel. The boxes or air-chambers *f,*

are preferred to be made of just sufficient depth to allow of their insertion between the lower deck timbers of the ship; or, if thought desirable, they may be raised above the level of the deck, and made of any convenient shape; their sides being in that case pierced, instead of their covers or upper parts.

In fitting steam vessels with his invention, the patentee proposes to connect the system of ventilating tubes with the steam-boiler furnace; for, by that means, not only is a more rapid circulation of air through the pipes produced than can be obtained by the passage of the vessel through the atmosphere, or by the action of the wind, but the furnace fires may at all times be fed with the required amount of air, even when, as in a storm, the hatchways are closed. To effect this object, he employs a "blow-fender," shewn in longitudinal elevation at fig. 5, and in cross section at *h*, fig. 2: this fender is made hollow, to admit of its receiving air from a branch pipe leading from the main air tubes *d, d*; and vents are made in the upper part of the fender, to allow of the escape of the air. The fender is set in front of the fire-places, and the escaping air is directed so that it shall enter the ash-pit, and pass between the fire-bars to the burning fuel.

In the system of distributing-pipes, valves or cocks are provided, at any required intervals, for regulating the supply of air, and for diverting the current, as may be found expedient.

A flexible tube may be attached when required, by means of a screw-plug, to any portion of the main conducting pipes, for the purpose of blowing foul air out of the hold, or any other close part of the ship not otherwise ventilated. Instead of employing the air boxes *f*, it is proposed, in some cases, to make openings in the main pipes themselves, and to cover such openings with wire gauze or perforated metal—one such opening being provided for every berth (if thought desirable); and, to allow of the supply of air to the berths being regulated according to the requirements of the occupants, sliding covers are fitted to the pipes, as shewn at fig. 6; which covers may be made to diminish or cut off the supply of air as required.

In order to ventilate ships, which are fitted for carrying cattle, air-conductors are provided at the sides, in lieu of, or in conjunction with, the head and stern air-conductors above described. These side-conductors are so constructed that they may be made to meet the air as the vessel proceeds in its course, and thereby set up a circulation of fresh air within the vessel. When stormy weather prevails, they may be closed like the port-holes of a ship.

Fig. 7, shews, in side elevation, a vessel fitted with the side

or port-hole air-conductors; and fig. 8, shews one of these conductors detached and in perspective. It consists of a hinged door *a*, which carries a bull's eye for the admission of light, and a screen of wire-gauze or perforated metal *b*, set at an angle to the door, and secured thereto by segment pieces *c*, *c*. When the ventilators are open, and the vessel is in progress, they will collect air and pass it through the screen *b*. This screen may, if required, be fitted with a sliding plate, having corresponding openings in it to allow of the amount of air supplied to the vessel being regulated; which may be effected by shifting the position of the sliding-plate, and thereby partially closing the openings when the supply is too great.

The patentee claims, First,—the manner of collecting the air at the head, the stern, and the poop-deck, and of distributing it to the various cabins and other parts of the ship requiring ventilation, as above set forth. And, Secondly,—the construction and use of the side air-conductors.

To PETER FAIRBAIRN, *of Leeds, in the county of York, machinist, and* SAMUEL RENNY MATHERS, *of Leeds aforesaid, flax spinner, for certain improvements in machinery for drawing the sliver and rove of flax, hemp, and tow.*—[Sealed 18th January, 1853.]

THIS invention relates, firstly, to a novel mode of mounting the pressing-rollers of flax spinning-frames; and, secondly, to a mode of adjusting the "reach" of the retaining-rollers simultaneously, without removing them from the machine. It has hitherto been the plan to mount the upper and lower pressing-rollers, in pairs, in a saddle or detached carrier; which is sustained in its place and made to bear up the pressing-rollers against the back and front rollers, by means of a rod, which passes through the saddle or carrier, and is connected to a weighted crank-lever. But this plan has rendered it difficult to determine the amount of pressure which the upper and lower pressing-rollers should respectively receive; and a further inconvenience has been, that when the carrier was drawn back, for the purpose of removing one pair of rollers, the other pair no longer retained their position, but fell out of their bearings. The arrangement which forms the first head of this invention is designed to remove these inconveniences; and, to this end, the upper and lower pressing-rollers are provided with separate carriers, which are seve-

rally suspended from a common axle, and are each provided with an independent weighted lever.

The figure, in Plate XII., represents, in cross section, so much of a flax spinning-machine as will serve to shew the mode of applying the present invention to the ordinary construction of flax spinning-machine. A, is the roller-beam, to which is bolted the stand B, as usual; and to this stand, arms, similar to that shewn at *a*, are secured. These arms carry a fixed axle *b*; on to which lever-carriers *c*, *c*, *d*, *d*, are strung,—the same being capable of moving freely thereon when required. Through each of these carrier-levers a rod *e*, *e*, is passed, and held thereto by means of a nut *f*, which takes into a screw cut on the end of the rod. The opposite end of the rod *e*, is hooked on to a pin carried by an ordinary weighted crank-lever *g*. The lever-carriers *c*, are furnished, at their lower ends, with a bush or bearing, which receives the spindle of a pair of pressing-rollers *h*, that run in contact with the roller *i*; and the lever-carriers *d*, are provided with an adjustable bush or bearing *d**, which receives the spindle of a pair of pressing-rollers *k*. A slot is made in the lever-carriers *d*, to receive a binding screw *l*, which holds the bush or bearing *d**, in position, and is capable, by being shifted up or down, of retaining that bearing at any required elevation, to suit the varying reach of the back rollers *m*, as indicated by dots. The amount of pressure to be put upon the rollers is determined by means of the weighted levers *g*, as heretofore. It will now be understood, that the rollers *h*, and *k*, are mounted independently of each other; and that the removal of one pair of rollers *h*, from the machine, for the purpose of renewal, will not cause the displacement of the rollers *k*, above them; and that the reduction of the diameter of the rollers *h*, by wear, will not affect the pressure put upon the rollers *k*, or necessitate a re-adjustment of the bearings of these rollers, as is the case when they are supported by the ordinary detached carrier or saddle. It will be understood, that the rollers *k*, *m*, are the retaining rollers, or those which first take hold of the rovings as they are fed into the machine; and that the rollers *h*, *i*, are the drawing-rollers, or those which elongate the roving as they receive it from the retaining-rollers.

In describing the second head of the invention, which refers, as before stated, to a mode of raising and lowering the back retaining-rollers simultaneously, the patentees remark, that hitherto it has been requisite, in order to change the length of reach or distance between the back and front rollers,

to remove the rollers from the machine and adjust the brackets which carry the back or retaining-rollers, one at a time, by means of an adjusting screw. By the present plan, however, it is not necessary to remove the rollers from the machine, nor to turn the adjusting screws singly. The arrangement for effecting this operation, with dispatch, will be understood from the following explanation:—*n*, is one of a series of brackets, which carry the back retaining-rollers; these brackets are capable of sliding up and down in guides formed in the stand B, for the purpose of raising or lowering the retaining-rollers *m*, and thereby altering the reach. Through each bracket *n*, a screw-shaft *q*, passes, and turns in bearings provided for it in the stand B. This shaft carries a worm-wheel *r*, which takes into, and is driven by, a worm *s*, on the horizontal shaft *t*, extending from end to end of the machine. By rotating this shaft, an axial motion is communicated through the worm *s*, and worm-wheel *r*, to the shaft *q*; and thus all the brackets *n*, are raised or lowered as required—carrying with them the rollers *m*, the elevation of which is determined to suit the various lengths of fibre under operation. The position of the pressing-rollers *k*, is then made to correspond to the rollers *m*, by shifting the position of the bearing *d**, of the carrier-levers *d*.

The patentees claim, First,—supporting the retaining and the drawing pressing-rollers on independent lever-carriers, in the manner above explained. And, Secondly,—raising and lowering the back retaining-rollers, simultaneously, by the means above described.

To GEORGE ELLIOT *and* WILLIAM RUSSELL, *both of St. Helen's, in the county of Lancaster, manufacturing chemists, for improvements in the manufacture of alkali.*—[Sealed 13th April, 1853.]

THIS invention of improvements in the manufacture of alkali relates to two of the processes in such manufacture; viz., the manufacture of black ash and the finishing of soda ash or the drying process. It is intended to apply to such processes a mechanical means of keeping in motion the material under operation, instead of employing hand stirring. This object is accomplished by the employment, in lieu of reverberatory furnaces, of revolving cylinders, with heat applied to them.

The cylinder is composed of cast-iron, with two or more ribs cast on it (according to its dimensions), and lined with

fire-brick. It must be mounted so that the heat will pass into it from the furnace, and out into the flue leading to the chimney; and it may, in some cases, have a central pipe, through which the heat may pass. The material to be operated upon is introduced at the upper part of the cylinder, and discharged, after the operation, at the lower part of the same.

In Plate XII., fig. 1, is a longitudinal elevation of a cylinder and furnace adapted for the manufacture of black ash; fig. 2, is a longitudinal section; and fig. 3, a transverse section of the same: fig. 4, is a longitudinal section of a cylinder, adapted for the finishing of soda ash, or the drying process; and fig. 5, is a transverse section of the same. *a*, is the cylinder composed of a cast-iron case, and lined with brickwork *b*; this cylinder has two ribs *c*, cast on it, and is supported by the ribs resting in the grooves on four wheels or pulleys *d*, *d**, two of which, *d*, are placed nearer the centre of suspension than the other two, and are connected by a shaft *e*, which is turned by a steam-engine or other prime mover. By this means the cylinder is made to revolve when required: the wheels *d**, which have no connecting shaft, merely revolving by the friction of the ribs *c*, on their grooved circumferences. *f*, is the furnace for supplying heat to the cylinder; *g*, is the ash-pit; *h*, is the pipe or flue, through which the heat passes from the furnace into the cylinder; and *i*, is the pipe or flue through which the draught is carried from the cylinder to the flue *j*, leading to the chimney; *k*, is an aperture with a door to admit air into the furnace; and *l*, is an aperture with a door at the other end of the apparatus, by which the process may be inspected. *m*, (fig. 1,) is the hopper by which the material intended for the manufacture of black ash is introduced into the cylinder; and *m**, (fig. 4,) is the hopper for the same purpose, when applied to the drying or finishing of soda ash. *n*, is an opening in the centre of the cylinder, for charging it with the material to be manufactured into black ash; *o*, is a door for covering the same; *p*, *p*, are openings for discharging the material when manufactured; *q*, *q*, are doors for covering the same; and *r*, *r*, are a series of tiles extending inwards from the brickwork *b*, of the cylinder, for the purpose of causing a more complete admixture of the materials during the revolution of the cylinder. *s*, (fig. 4,) is a central pipe or tube extending the whole length of the cylinder, through which the heat and flame from the furnace may pass, instead of going into the cylinder.

The mode of carrying the two processes into operation is

thus described—commencing with the manufacture of black ash:—A charge of the material used in this manufacture having been placed in the hopper *m*, (which can be conveniently carried from the roof,) and the fire having been lighted and kept burning sufficiently long to make the whole of the interior of the cylinder red hot, the charge is dropped from the hopper, and, the three doors *o*, and *q*, *q*, being all closed and fastened, the charge is then suffered to heat for about ten minutes. The driving-wheels *d*, are now set in motion, and the cylinder made to effect half a revolution: it is then stopped for about five minutes; after which another half revolution is given to it. This alternate movement and repose is continued until the material in the cylinder begins to flux, which takes place in about an hour. The cylinder is then kept constantly revolving, at the rate of about one revolution in every three minutes; the required mixture of the materials being facilitated by the tiles *r*, which operate as mechanical stirrers of the same.

The progress of the operation of manufacture may be seen by the attendant, on opening the door at *l*; and, when the process is ascertained to be complete, the doors *o*, and *q*, *q*, are opened; the cylinder being stopped when they are at their lowest position, so that the black ash may flow out into suitable iron vessels placed below the cylinder to receive it. A half revolution is then given to the cylinder; and a fresh charge having been let down from the hopper *m*, the doors *o*, and *q*, *q*, are secured, and the cylinder is ready for a fresh operation. The smoke is found to be advantageously consumed by occasionally opening the door at *k*.

In the finishing of soda ash, or the drying process, the cylinders are made to revolve in the same manner as in that just described. If the object in view be to make an alkali or soda ash fit for the manufacture of soda crystals, there is little difference in the arrangement of the cylinder; only that, in such case, a bar of iron is introduced, of about two inches square, in the cross section, and of nearly the internal length of the cylinder; which bar, after being carried up a certain height by the projecting tiles *r*, falls on to the soda ash or alkali, lying at the bottom of the cylinder, and breaks the lumps; thereby facilitating the exposure of more surface of the material to the action of the fire; but, when it is important that the soda ash should not be contaminated and soiled by ashes brought over by the draft from the fire, a pipe or tube of iron (which is preferred to be of cast-iron) is inserted in the cylinder, as shewn at *s*, fig. 4. This pipe passes

through the cylinder, and, being fixed to it at the ends, moves with it. The heat and flame from the fire is thus made to pass through this central pipe, and the soda ash within the cylinder is dried by the heat radiated from it. In some cases it is preferred that this central pipe or tube should be constructed of circular tiles, manufactured for the purpose, and held together by an iron framing. As, in this process, it is important that the damp or freshly-introduced soda ash should not fall on the highly-heated pipe, this is prevented by stopping the cylinder in the position shewn at fig. 5, when the charge is to be dropped into it from the hopper *m**: the damp soda ash will then fall to the bottom of the cylinder without coming in contact with the pipe *s*. When half the charge has entered the cylinder, one or two revolutions must be given to it in order to spread the soda ash before the remainder is introduced. When this last-described process of drying is used, the projecting tiles and iron bar, for crushing in the cylinder, are dispensed with.

The patentees propose, in case it should be found desirable, to apply a tilting motion to the cylinder, so as alternately to raise and depress its two ends; but, in most cases, this plan would not be required, as the motion of the cylinder, before described, would be sufficient. The heat might also be applied to the external surface of the cylinder; but the modes of applying the heat, hereinbefore described, for the drying or finishing process, are preferred.

The patentees claim the manufacture of black ash, and also the drying or finishing of soda ash, by means of revolving cylinders, as described.

To RICHARD BARTER, *of St. Ann's Hill, Blarney, in the county of Cork, M.D., for improvements in cutting roots and other vegetable substances.*—[Sealed 7th March, 1853.]

THIS invention has for its object the cutting of roots and other vegetable substances into pieces of various sizes, with the means of regulating the degree of fineness of the division of such pieces.

The machine or apparatus for the purpose consists of a circular disc or drum, or of two discs, united by cross pieces with a drum or driving-wheel between them, suitably mounted in a frame, and having an operating surface of suitably-formed knives or cutters on each side of the said disc, or on the outer sides of the pair of discs. This cutting apparatus is made to revolve between two hoppers, placed one on each side thereof,

—the hoppers being open at the side next the knives, so that the roots and other vegetable substances contained therein may, as they fall down, come in contact therewith, and be cut or divided as required.

Knives or cutters are screwed on to both faces of the discs; and the degree of their projection is regulated by means of substances placed between them and the face of the disc, and by adjusting screws. The pair of discs may also be formed, so as to dispense with the use of knives, by punching them so as to form sharp projections upon their surface.

In Plate XII., fig. 1, is a vertical section, and fig. 2, a plan view of the machine or apparatus. *a*, represents the frame or standards; b^1, and b^2, the pair of metal discs, united by cross pieces *c*, *c*, and connected to the driving-wheel *d*, turning on an axle *e*, mounted in bearings *f*, fixed to the frame; *g*, *g*, are knives or cutters screwed into the outer face of the discs; and *h*, *h*, are hoppers, into which the roots and other vegetable substances are introduced. These hoppers have an open side at h^*. It will be seen that, on the introduction of roots and other vegetable substances into the upper part of the hoppers *h*, *h*, they will, by their own gravity, fall down towards the knives or cutters *g*, *g*, so as to come in contact therewith, and be operated upon thereby, during the revolution of the discs driven by the wheel *d*, which may be actuated either by manual or mechanical power.

It will also be evident that the roots and other vegetable substances, thus brought in contact with the knives or cutters, will be divided, more or less, according to the particular form and degree of projection of the same from the face of the disc. Any convenient number of the knives or cutters may be fixed to the discs; and their form may be varied from those represented.

The patentee remarks that, in some cases, it may be desirable to use different forms and numbers of knives or cutters on the two operating sides or faces of the discs. In all cases, however, the operation by which the roots and other vegetable substances are brought in contact with the knives or cutters on the discs, or with the cutting surfaces of the discs themselves, and cut or divided by them—will be the same as that above described.

The patentee claims the mode described of cutting roots and other vegetable substances by means of a disc, or a pair of discs, with knives or cutters thereon; such disc or drum, or pair of discs, revolving between two hoppers, or at one side of one hopper, with open sides or side next the operating face of the disc.

To James Carter, *of Trump-street, London, manufacturer, for improvements in the manufacture of certain articles of dress or apparel.*—[Sealed 24th November, 1852.]

The patentee describes his invention in the following words: —"My invention consists of forming certain articles of dress or apparel denominated neck-ties, or scarves, fichus, or otherwise similarly defined. I call the principal article, manufactured by me under the aforesaid letters patent, a 'tubular scarf'; and such scarf, tie, or otherwise, may be made of satin, tabby, barathea, or other suitable material, and may be of any one color, or of several colors, as may be found desirable, or as fashion may require. I use the loom ordinarily used with battens, on the principle of the driver. Each scarf or tie will require a separate space and shuttle, and is made with two rolls and two openings,—the shuttle passing alternately through the top and bottom opening or canes; thus joining the top and bottom cloths at each edge, so as to produce a circular or tubular cloth of any width, from one inch to forty or upwards; and such cloth is made with thirty-two shafts and sixteen lamms, which are entered to suit the top and bottom opening, and can be made with one or more rolls to each scarf, so as to suit the different ties of the upper and lower cloth, whether such cloth be of satin, Brussels, barathea, or tabby, or satin on one side and tabby on the other, or Brussels on the one side and satin on the other. I consider the foregoing description sufficient to enable all practical silk weavers to make the objects of my invention, whether such objects be scarves, ties, fichus, or other similar tubular-made articles of dress or apparel."

To William Wilkinson, *of Nottingham, framework knitter, for improvements in the manufacture of ropes, bands, straps, and cords.*—[Sealed 21st February, 1853.]

This invention consists in manufacturing ropes, bands, straps, and cords, in the following manner:—For circular ropes and cords, the patentee takes a core of gutta-percha or other waterproof material, either solid or hollow, and plaits or braids round it strands of hemp, silk, or metal wire, or strips of leather, or other protecting material, which can be laid on in a plaiting or braiding-machine. For flat bands and straps, he covers a flat solid or hollow band of gutta-percha, or other like material, with plaitings or braidings of hemp, silk, or

metal wire, or strips of leather, or other protecting material. Where additional strength is required, several cords, made as before described, are combined as a core, and strands of wire, hemp, or other like suitable material, are laid around them by a plaiting-machine. Should it be desired, the threads of hemp, or such like material, forming the strands, may be passed through a waterproofing material; or the ropes, after being manufactured, may be waterproofed, in order to render them impervious to wet or moisture.

The patentee claims the several methods, hereinbefore described, of manufacturing ropes, bands, straps, and cords.

To JEAN BAPTISTE MANIQUET, *of Paris, manufacturer, for certain improvements in machinery or apparatus for winding, cleaning, doubling, twisting, and spinning silk, cotton, wool, flax, hemp, and other filamentous materials.*—[Sealed 14th April, 1853.]

THE first part of this invention consists in giving direct motion to the reel or swift, which is so arranged as to adjust itself to the size of the skein, as well as to the bobbins; by which means the winding operation is said to be carried on with less breakage than heretofore.

In Plate XIII., fig. 1, shews a side view, and fig. 2, a partial front view of the reel or swift, and the apparatus connected therewith. A, is the reel, mounted on a frame B, and carrying at its periphery the skein C. The reel is composed of several arms *a*; on the inner ends of which are formed teeth, into which a pinion works, so as to enlarge or diminish the size of the reel, to adapt it to the size of the skein. The axis D, of the reel has, at its extremity, a small pinion E, which works into the pinion F, on the axis G; upon which axis is also the pulley H, from which a band I, passes to the pulley J, on the main axis *d*. It will be seen that, by giving motion to the reel in this manner, the power is given of stopping the reel, by raising the teeth of the pinion E, out of those of the pinion F, without interfering with the rest of the machinery. The main axis *d*, also carries another pulley *e*, which, by means of a band *f*, passing over the pulleys *g*, *g*, gives motion to the pulley *h*, of the bobbin K. There is also on the axis *d*, a pinion *m*, working into a toothed wheel *n*, on the axis k^1. This axis k^1, carries a cam j^1, which acts on the lever *j*, turning on the centre *l*; and this lever *j*, acts on the guide-bar *i*, so as to distribute the fibre evenly on the bobbin K.

The second part of this invention consists of an arrangement for causing the lower end of spindles employed in twisting or spinning fibres, to turn in vessels or cups containing oil. A spindle arranged in this manner is shewn in section, at fig. 3. At the bottom of the cup K, containing the oil, is a screw q, the upper end of which forms a pivot, on which the spindle o, turns: the lower end of the spindle o, is formed into a tube l, which is pierced with holes f, f^1, through which the oil passes. On the screw centre q, is attached a spiral rib R, which, when the spindle revolves, causes the oil to circulate, and insures a sufficient supply to the rubbing surfaces. The pulley or wheel h, is so formed as to cover the oil-cup, and exclude dust and broken fibre therefrom. Fig. 4, shews a modification of fig. 3, where, in place of having a tube on the end of the spindle, the spindle is pierced at its lower extremity, so as to lead the oil to the centre; and a spiral groove, or a projection, is formed on the spindle, to supply the oil to the rubbing surfaces.

The third part of this invention consists in placing on the spindles, employed for twisting and doubling fibres, revolving nipping surfaces, which, by holding the fibre between them, regulate the length of fibre drawn from the twisting spindles, and also the speed of winding on to the bobbin after doubling. Fig. 5, shews, in partial front elevation, a machine for twisting and doubling silk and other fibres. Fig. 6, shews, on a larger scale, a doubling spindle F, fed by two twisting spindles G (see fig. 5). These three spindles have each the same mechanism, except that the spindles G, G, turn from the right to the left, to twist the fibre, whilst the spindle F, turns from the left to the right, to double the fibres together. It will be understood that the number of twisting spindles to each doubling spindle will vary according to the class of cord to be produced. x, is a spindle, on the lower end of which is a worm t, into which works the tooth-wheel z, on the axis y, to which motion is given by a band on the driving pulley. On the axis y, is a toothed wheel, which, by means of an intermediate wheel, gives motion to another wheel on the axis b^1. The toothed wheel on the axis b^1, works into a worm t^1, on the hollow axis, x^1. On the upper end of the spindle x, the bobbin r, is placed, and is there retained by the spring s, (see plan view, fig. 7). Keyed to the spindle x, is a boss H, on the under surface of which are a series of pins u, which enter holes in a similar boss I, which works loosely on the axis x. On the hollow axis x^1, is a cross piece x^2, which carries the standard z^2, in which is centered the lever v^1, which carries

the small roller *v*, which roller *v*, is pressed against the under side of the boss I, by the spring y^2; and thus the nipping of the thread between the surfaces H, I, is effected. The working of this arrangement will be more clearly understood by following the thread as it comes to the spindle. After leaving the spindles G, the fibres pass over the pulleys d^1; then over the small pulleys c^2, c^2, on the frame c^1; then between the nipping surfaces H, I, to the bobbin *r*. It will be seen, that whatever be the surface speed of the bobbin *r*, it can only wind on as much as is given by the nipping surfaces, which will depend on the relative speeds of *x*, and x^1. There is a catch v^2, on the frame x^2, so arranged as to remove (when necessary to repair a breakage in the thread) the roller *v*, from the boss I, and thus allows it to fall out of contact with the boss H.

The patentee claims, Firstly,—The peculiar arrangement of apparatus described under the first head of the invention, and the giving motion to the reel or swift, as well as to the bobbins. Secondly,—The arrangement of apparatus described for causing the lower end of spindles employed in winding, doubling, twisting, or spinning fibres, to turn in vessels or cups containing oil. Thirdly,—The placing on the spindles employed for twisting and doubling fibres, revolving nipping surfaces, as above described.

To William Whitaker Collins, *of Buckingham-street, Adelphi, civil engineer, for certain improvements in looms for weaving,—being a communication.*—[Sealed 21st March, 1853.]

This invention consists in the application of certain improvements to that description of looms known as circular looms; by which various kinds of manufactured articles are produced, having the warps and wefts laid alternately, or interwoven with each other.

The loom consists of three principal subdivisions,—the upper portion being the spooling-frame, or support for the warp-bobbins; the next or middle being the part whence the manufactured product is delivered; and the lower part, the plates upon which the weaving machinery is fixed.

The warps are brought down and pass between guides or levers, which are alternately elevated and depressed; the wefts, which, in the present case, are two in number, are made to revolve in a horizontal circular plane, by which (in conjunc-

tion with the alternate motion of the warps) the weaving is accomplished.

In Plate XIII., fig. 1, represents a section, and fig. 2, a plan of the lower part of the loom. E, and F, are plates, connected with each other by three feet, having a free space between them to allow for the wheels G, and H, with their necessary supports; and D, is a plate fixed to the plate E, by means of the bolts *a*, and columns *b*. The wheel G, which receives motion by any ordinary means, gears with the pinion H, which is fixed on the vertical or main shaft I. To the main shaft I, the wheel J, is fixed, which has an excentric groove *c*, on its upper surface. The plate D, is furnished with projections on its upper and under surface (see fig. 1,); those on the upper surface consist of ten pairs, marked K, and K^1, placed equidistant from the central axis of the loom, and in the spaces between each pair of projections the warp-guides *d*, and d^1, move. The projections K, K^1, are so arranged as to form, on the top surface, portions of a circular groove, in which the weft-frames move. The portion of the frame which fits in this groove is made of sufficient length to enter one groove before leaving the other, and is indicated by the dotted lines on fig. 2. It is furnished with a segment rack, which is acted upon, at all times, by two pinions *e*,—one taking into the rack before the other leaves it. There are ten of these pinions *e*, fixed on the upper parts of the spindles *f*, and motion is given to them by a wheel J, working into pinions fixed to the lower end of the spindles *f*. On the under side of the plate D, there are projections *g*, to serve as supports or bearings for the spindles *h*, on which the lever L, is fixed. It will be seen, by reference to the drawing, that by the revolution of the excentric groove *c*, the levers L, (of which there are ten) vibrate and communicate—by means of the connecting-rods M, and N,—a rising and falling motion to the levers or warp-guides *d*, d^1, which have fulcrums a^1, between projections on the top of the plate D.

The following is the mode of operation of the loom:—The warps descend from the spools or bobbins to the centre of the machine, and pass over a guide of the size adapted to the description of material to be woven. The weft bobbins are, in this case, two in number; and the wefts passing from them also tend towards the centre. It may be here remarked, that two weft bobbins are absolutely necessary; and, for manufacturing some description of material, more than two are requisite. Now it will be seen that, by the alternate rising and falling of the warp-guides, the weft is, by means of its rota-

tion, interwoven with the warp. Each lever L, operates upon eight warp-guides, causing every other one of these guides to be alternately elevated and depressed,—one weft being on one side of the machine, over the warp-guides *d*, and under those marked d^1; and on the other side of the machine over the warp-guides d^1, and under those marked *d*.

To ensure uniformity of tension on the warps, levers and weights are applied, as shewn in elevation at fig. 3. At one end of the lever *i*, a small open ring *j*, is fixed, which receives the thread (in the manufacture of silk fabrics glass is preferred for this purpose): a small weight *k*, is fixed to the other end of this lever. The axis of this lever is formed by a bent wire *l*, which operates at two intervals,—viz., the part marked *l*, serves as an axis to the lever *i*; and that marked l^1, serves, at the next interval, as an axis to the lever *m*, and limits also the motion of the lever *i*. The lever *m*, presses, with its foremost end, on the angular edge of the spool *n*, in proportion to the weight fixed on the other end of the same, and thus serves as a brake. The lever *i*, with its weighted arm, passes under the lever *m*; so that the part which constitutes the brake is relieved, when necessary, and thereby any inequality of tension is corrected. It is obvious that the weights should be regulated according to the nature of the material manufactured; it may, however, be well to observe, that the weight *o*, should never be so light as to cause the spool to let go the thread before the lever *i*, has lifted up the weight *o*.

The contrivance by which the spooled weft-threads are delivered during the process of weaving, and the necessary tension maintained, is shewn at fig. 2. The bow *p*, is united to the piece *q*, in an oblique direction; and the axis *r*, of the weft-bobbin *s*, to which a sheave or disc *u*, is fixed, revolves in bearings in the arms *t*: the extremities of the bow *p*, are smoothly indented. When the weft-thread is withdrawn from the spool, during the process of weaving, any extreme tension tends to open one portion of the bow, and thus release the disc or sheave *u*, which is fixed to the bobbin *s*,—the amount of the tension being regulated by the spring *v*, fixed to the piece *q*.

The mode adopted for delivering the manufactured article out of the loom, when the fabric is of a braid or ribbon-like nature, and capable of being equally reeled off, is shewn at figs. 4, and 5. At the top of the upright spindle *w*, a small worm is fixed, which works into a small worm-wheel *x*, carried by a horizontal shaft *y*, revolving in suitable bearings. On this

horizontal shaft is a toothed wheel Q, which gears into a wheel of somewhat smaller diameter, fixed to a horizontal shaft R; and fixed to the opposite end of the first-mentioned shaft y, is a serrated pulley, the teeth of which are alternately set in contrary directions, for the purpose of forming a groove on the periphery of the pulley. The revolution of this pulley will draw up the manufactured article without the possibility of its slipping off; and a roller T, carried by the horizontal shaft R, then takes up the fabric and passes it out of the loom. The fabric is conducted towards the serrated pulley, and from the centre of the loom over suitable guide-pulleys, and thence between the rollers T, and V, to any convenient situation.

The patentee claims the principle of weaving, in a horizontal circular plane, by means of two or more wefts, as before described; also the mode of maintaining the tension of the warps and wefts, as well as the mode of delivering the manufactured article, as hereinbefore described.

To François Durand, *of Paris, in the Empire of France, and Castle-street, Holborn, for an improved kind of loom.* [Sealed 15th March, 1853.]

This invention relates to an improved construction of circular loom.

In Plate XII., fig. 1, represents a side elevation of the loom; and fig. 2, is an end view of the same. Fig. 3, represents, in detail, the principal part of the loom. It consists of a centre gearing wheel-piece A, toothed inside and outside, and causing four pinions to move, with which the gearing-wheel of the shuttle works. The centre gearing wheel-piece A, is held between two immoveable plates, fixed upon supports, and supporting the axles of the four pinions. These pinions cause a shuttle Y, to move, (see fig. 5,) which is mounted upon a portion of the centre wheel-piece gearing with two pinions, and which is held between the two immoveable plates by two little guides entering into slots made in this plate. In place of the centre gearing wheel-piece A, a wheel, toothed interiorly, and bearing exteriorly a groove like a pulley, may be employed: it may be made to move by a cord or leather strap. The shuttle Y, shewn larger in fig. 5, by the action of the centre wheel gearing piece, receives a circular movement; and it thus passes between the threads of the warp, which are worked by means of ordinary harness.

In order to render the following description easier and more

intelligible, the movement of the warp and that of the weft is described separately. The warp is, as in looms with a batten, upon the bobbins B, B; and passes over the pulleys by weights C, C, which hold it constantly stretched: and after having passed between the fixed glass rods D, D, it extends horizontally, and is held in this position by a small moveable comb of reeds: it then passes through the harness E, E, indicated upon the drawing by the dotted lines, and thence into the comb F, which is sufficiently high to permit of the opening of the threads of the warp. At a little distance further from this comb, the warp is discontinued: it is joined to the weft, and constitutes the tissue. The warp is divided, as shewn, into three parts; one of which remains fixed and horizontal, while the two others are alternately raised and lowered by the movement of the harness. It is in the two openings formed by these three portions of the warp, that the shuttle and the weft which it contains pass.

The warp may also be divided into two parts in place of three, which depends upon the kind of tissue required to be manufactured. The movement of the harness is as follows:—The handle G, is put in motion, which causes all the moveable parts of the loom to work: the axle H, upon which it is fixed, transmits its motion to the wheel J, by the intermediate wheel K. Upon the axle of the wheel J, are placed two excentrics L, L, which are altogether like those actually employed in looms for weaving: these excentrics act upon the levers or rods M, M, with the extremity of which the harness E, E, communicates, and passes over the roller N. The harness is arranged with the excentrics L, L, so that the opening of the warp shall correspond with the passage of the shuttle. The levers M, M, are furnished with rollers, for facilitating the movement of the excentrics L, L: and they may be lengthened or shortened, to increase or diminish at will the opening of the threads of the warp. The shuttle bearing the weft moves, as before stated, by the action of the toothed bar A, which is moved by the wheel P, fixed upon the axle I: this axle receives a movement from the axle H, by means of two bevilled pinions. The comb F, in which the threads of the warp pass, is placed so as not to hinder the motion of the shuttle Y. For this purpose it is arranged as shewn in the section fig. 3, and in end view fig. 2. When the shuttle has passed between the threads of the warp, the comb advances, and forces the thread of the weft against the tissue already made. The comb is put in motion by means of an excentric Q, fixed upon the same axis as the excentrics L, L. The excentric Q, has a groove, in

which a roller R, works, which is joined to the bar S; this is fixed, at its lower part, by a bolt forming a hinge; and its upper part, which is forked, is joined to the end of the rod T, which is also forked, and passes across the body of the loom (which serves as its guide), and is attached to the annular plate which supports the comb (see figs. 2, and 4). The comb and the annular plate are arranged so as not to hinder the movement of the shuttle. The projecting parts of the excentric Q, cause the comb to advance when the shuttle is passed; that is to say, when the different parts of the warp are in a horizontal position. As is evident, this arrangement of circular loom allows of passing two threads of the weft at each turn, one above and one below, at each movement of the harness; but, independently of this advantage, one still greater is obtained by employing two shuttles in place of one. They may be then placed opposite one another, and upon the same diameter. It will be understood that, by the aid of these two shuttles, it is only necessary to cause them to make a half turn to pass the two threads, since each of them will pass one; and, by making the harness and the comb move twice as quickly (which is very easy), the double tissue will be made in the same time, without the shuttles going quicker. Fig. 4, represents an apparatus serving to manufacture the large bobbins which are used in these shuttles, in order that the bobbins need not be constantly renewed, as is obliged to be done in looms with a batten. To manufacture these bobbins, a spindle *a*, is employed, around which a piece of paper is placed; and then two half cylinders *b*, having their edges (instead of meeting together) turned outwards (see fig. 4). These portions of the cylinder, being kept separate by the spindle *a*, serve to hold a series of segment pieces *c*, diminishing in size. It is between these segments that the thread for forming the bobbin is wound. When they are full, the spindle *a*, is removed: the segments *c*, can then be raised; and the semi-cylindrical pieces *b*, may be brought nearer together. These are in turn taken away, and the bobbin of thread rests upon the roll of paper. It is then placed in the shuttle, where it unwinds uniformly, and without becoming entangled. The loom is furnished with a regulator for the unwinding of the tissue, manufactured like an ordinary loom. This loom serves to manufacture, with the greatest facility, tubes for pumps, and all kinds of fabrics in form of tubes. Two warps might be employed, one below and the other above,—the same thread of weft passing through both. The tissue, obtained by the aid of two warps, will be found

joined on both sides by the weft, and will present the form of a tube.

The circular loom above described, may, by the aid of a simple modification, be applied to the manufacture of ribbons and striped tissues of many colors,—the warp remaining always in the same position, and arranged in the same manner. Under this modification, that portion of the loom shewn in fig. 3, also remains the same, only it is of larger dimensions, and carries a shuttle with the colors desired to be employed; and, instead of being fixed upon supports, it is moveable, and may be raised or lowered at will, so as to permit the shuttles to pass above or below the threads of the warp. It will be easily understood that, by the aid of this arrangement, and a Jacquard, to make the threads of the warp rise and fall, any desired pattern may be made.

The patentee claims, First,—the circular loom, as above described,—this loom being especially characterized by the circular movement of the shuttle, and serving for the manufacture of all sorts of tissues. Secondly,—the arrangement of the same loom to manufacture ribbons and other striped tissues of one or many colors. Thirdly,—the apparatus serving for the manufacture of bobbins of a new form, and which may be applied to the shuttles of looms with a batten, as well as to those of the circular loom of this invention.

To William Pidding, *of the Strand, for improvements in the manufacture of woven, textile, or other fabrics, and in the machinery or apparatus connected therewith.*—[Sealed 5th April, 1853.]

The means pursued by the patentee, in carrying this invention into effect, are as follow:—Silk, or other material of close texture (including paper), is saturated with gelatine or gum, and stretched on a frame;—points of wire or needles, arranged and fixed in an instrument, in accordance with the design previously made on the fabric, are passed through the silk or other material thus prepared, and a fabric is produced by inserting studs, or other forms of material (described in the specification of a patent granted to the present patentee on the 9th March, 1853) into the holes so punctured; which holes are made to retain their form by allowing the gelatinized or gummed fabric to dry before the points of the wire or needles are withdrawn. If wood, paper, or millboard be used for the groundwork of such fabrics, they may be rendered

waterproof by saturating them with drying oils, or a solution of India-rubber, varnish, or other coatings of similar properties. When the fabrics are thus prepared, the gelatine may be rendered insoluble; or the fabrics so prepared may be converted into leather by tanning, either before or after the studs are inserted into the perforations. The substances which are inserted into the perforations are threads of every description, and spun glass gelatinized or gummed. After they have been allowed to dry, they are cut into studs by means of numerous knives, placed in a frame, fastened or pinned to a support at one end, and worked by a handle at the other end: that end of the knife-frame which is fastened, is allowed to move in a pivot; the knives act simultaneously against all the threads; and they are likewise placed parallel to each other, and at such distances apart as the length of the studs may be required to be cut. When the studs are secured in the perforations, the gelatine or gum is washed away with hot or cold water. The fabrics, thus produced, may then be affixed to articles of furniture, or any other articles, by any adhesive substance. In some cases the surface of the fabric is ground after it has been affixed, by adhesion, to any article; and it is then varnished by any transparent or hard varnish, and polished by any ordinary method, and with the ordinary materials used in polishing.

To JAMES NAPIER, *of Partick, in the county of Lanark, chemist, for improvements in separating certain metals from their ores and alloys, and for obtaining certain products therefrom.*—[Sealed 23rd April, 1853.]

THIS invention relates to the treatment of the ores and alloys of copper and tin.

In treating the ores of copper the patentee proceeds in the following manner:—All those ores which contain sulphur, commonly termed sulphurets, are arranged in two classes, viz., those known or found, by testing, to contain tin as an impurity, and those that contain no tin. In dealing with ores of the first class, he mixes them, as far as practicable, in such proportions that the whole copper in the mixture shall range from 8 to 14 per cent. of the total weight of the ores. This mixture he then calcines in the ordinary way (well known to copper smelters), until the quantity of sulphur remaining in the ore does not exceed a fifth of the weight of the copper, which may be ascertained by taking out a small sample,

grinding it, and boiling 25 grains in *aqua regia* for 15 minutes; diluting the product with distilled water, filtering, and adding to the filtered liquor chloride of barium, to precipitate the sulphur. This precipitate being collected, dried, and weighed, contains 3 grains of sulphur in every 22 grains of its weight. But in the treatment of ordinary sulphuret ores, a period of calcination of from 16 to 18 hours is found to be sufficient to expel the excess of sulphur. The ore is then withdrawn from the calciner, and transferred to an ordinary fusing furnace; and to every ton of calcined ore about 1 cwt. of coal is added: this addition of coal is not essential to the process, but it is preferred to use it in order to obtain clean slag. The whole is then well fused, and the slagged matter being skimmed off in the usual manner, the "mat" or metallic portion is run off into sand-beds. At the bottom of the first and second beds is found a coarse alloy, known as "white metal," which consists mainly of copper, tin, and iron, with small portions of such other metals as may have been contained in the ores. This white metal or alloy is removed and reserved for another process of treatment, to be hereinafter described; and the remainder of the mat (called "regulus" or "coarse metal,") now freed from the tin which was associated with the copper in the ores, may be roasted and refined by the ordinary methods; but it is preferred to calcine it again for 18 hours, and then to fuse it along with other ores containing no sulphur, such as those commonly imported from Australia; using equal weights of the ore and of the calcined regulus. A small proportion of coal should be added to this mixture, to obtain clean slag. The product of this fusion, after a few hours roasting in the usual manner, is fit for refining.

The second class of sulphuret ores (which contain no tin) is mixed in the same manner as the first class, but in such proportions that the copper in the entire mass shall not be less than 9 per cent of the total weight; and this mixture is calcined for 12 hours, and fused in the manner above described. Should the copper in the ore have exceeded 12 per cent. of of the total weight, it is preferred to add about 1 cwt. of coal to each charge, to prevent loss of copper in the slag. The coarse metal or regulus obtained by this fusion is calcined again for 24 hours, after having been ground or granulated in the usual manner. It is then fused with ores containing no sulphur, or with the calcined mat obtained by treating ores of the first class (containing tin), and the product obtained is treated by fusing, roasting, and refining, according to the ordinary methods known and practised by smelters.

When the ores of copper contain tin and no sulphur, they are mixed with sulphuret ores, and, in preference, with such as contain tin,—using such quantity of each kind as shall give the relative quantity of sulphur to the copper contained in the mixture, in the proportion hereinbefore mentioned; and then the operation is proceeded with, in the manner above stated, by calcination and fusion, to obtain the metallic products, viz., regulus and white metal. When the earthy matters of the mixed ores are difficult to fuse, a little fluor spar, lime, or oxide of iron, may be added as a flux; but in that case it is preferred to let the sulphuret ores be calcined for nine hours, or thereabouts, before mixing them with the other ores: the mass becomes, by this mode of treatment, easily fusible without flux.

The second part of this invention consists in a method of separating the tin and copper of the alloy known as white metal, whether produced by the process, or in the manner hereinbefore described, or by any other process whatever. The alloy is first ground to a fine powder by any of the ordinary processes, and the powder is then oxidized by subjecting it, for a few hours, to the common operation of calcining at a low red heat. When oxidized, the powder is black, and gives little nitrous fumes when a little of it is put into dilute nitric acid. But it may be oxidized also by direct chemical agency, as by heating it along with nitrates or other compounds which yield oxygen readily by heat.

When the powder has been completely oxidized, it is transferred to an iron pot containing caustic soda, in the proportion of not less than 1 lb. of dry caustic alkali to each pound of tin in the alloy. Heat is then applied to the pot (the materials being meantime stirred together) until the temperature is between 600° and 900° Fahr., when the soda and oxide of tin combine, and form stannate of soda. When the temperature has been maintained at a low red heat for about an hour, the mass is transferred from the pot to another vessel, and allowed to cool, and the pot is again charged with a new portion of soda and powder.

Caustic potash may be used instead of caustic soda; but in that case 30 lbs. of the dry alkali must be added for every 100 lbs. of the powder. Carbonate of soda or potash may also be used, but caustic soda is preferred. Instead, however, of oxidizing the powder in any of these ways, the oxidation may be effected by adding 30 lbs. of the nitrate of soda, with 20 lbs. of caustic soda, to 100 lbs. of the ground alloy in an iron pot (adding the alloy in small quantities at a time), and

heating the mixture as above described. The metals are thereby oxidized, and the tin is dissolved. But additional care is necessary in this process, as the action of the nitrate salt on the metal is sudden and violent. When the melted mass, drawn from the pot, is cooled, water is added, which dissolves the stannate, and the oxides of copper and iron remain insoluble, and are separated by subsidence, or by filtration. These oxides are removed and mixed with the charge in process of roasting, by which the operation is facilitated, and the metal is obtained. To the solution of stannate of soda, slacked lime, reduced to a pulpy state by water, is added, (using about 27 lbs. of lime to every 100 lbs. of the stannate in solution) and boiled. During the boiling, a little of the mixture is taken out every few minutes, and tested with lime-water, until no precipitate is produced; when the process is complete. During this operation an insoluble stannate of lime is formed, which, when the boiling ceases, subsides to the bottom; and the caustic soda remaining in solution is used over again for dissolving the oxide from the powder. The stannate of lime is collected and dried; and to every six parts are added two parts of silica or sand, as free as possible from iron, and one part of anthracite coal or other carbonaceous matter, and the whole is fused in a reverberatory furnace; whereby the tin is obtained in the metallic state.

In extracting tin from its ores, the following mode is adopted:—The ores, after being washed and assorted, as now done, are, when constituting a sulphuret of tin, subjected to a short calcination, to convert the tin into an oxide: when, however, the ore is primarily an oxide of tin, no calcination is required. The ore is then treated in the manner before described with reference to calcined or oxidized alloy,—about 7 lbs. of soda being used for every 10 per cent. of tin contained in the ore. All the operations afterwards necessary for obtaining the tin are the same as have been already described; but should the tin ore contain a little copper, which is often the case, then the copper will be left with the other insoluble matters in the ore when the stannate of soda is dissolved out, and may either be reduced by fusing with carbonaceous matters, or it may be collected, dried, and sold as copper ore.

In concluding this specification the patentee says:—"Having thus described my invention, as applicable particularly to ores of copper and tin, and the alloys of those metals, I wish it to be understood that my improvements are likewise applicable to all matters containing those metals or their oxides, and that I claim the application thereto accordingly."

To Robert Beart, *of Godmanchester, in the county of Huntingdon, for improvements in the manufacture of bricks and other articles through moulding orifices.*—[Sealed 1st October, 1852.]

This invention consists, first, in combining with the pug-mill a screen, so that the clay may be forced through the screen by a piston, into the pug-mill; and, secondly, in causing the axis of a pug-mill to descend through the bottom, and, by means of gearing below, to give motion to an axis, which, by racks, gives motion to the piston, which forces the plastic material through moulding orifices.

The means pursued by the inventor in carrying out this invention are as follow:—At the upper part of a pug-mill, a rectangular metal trough is affixed; the end near the pug-mill is closed in at the top, bottom, and sides; whilst the part beyond is open at the top, in order that, when the piston is moved back, as far as it will go in the trough, the clay or brick-earth may be introduced in front of the piston; whereby, when the piston is again moved towards the pug-mill, the clay or brick-earth in the trough will be forced forwards by the piston, through a grating which is fixed near that end of the trough which comes near the pug-mill: by this arrangement, the clay or brick-earth, thus fed into the pug-mill, will be screened, and rendered free from stones or roots. In order to keep the screen free and open, a cutter, of the size of the screen, is caused to descend through a slit or opening at the top and behind the grating, to sever the clay, just before the piston commences to move back. Hence any stones or roots in the clay will go back with the piston, which is made concave hollow on the front surface, in order that it may not come up to the grating. By this arrangement, when the piston goes back, the stones and roots may be removed before the piston is again moved forward by the working of the machine.

The patentee remarks, that this construction of screening apparatus is not new, and therefore no claim is made thereto; but that this part of his invention consists in combining a screening apparatus, such as above described, with a pug-mill; in order that the clay or brick-earth may, in place of being fed directly into the pug-mill, be fed into the trough, and forced therefrom, through a screen, into the pug-mill.

The second part of the invention consists in causing the axis of the pug-mill (on which the knives are placed) to descend through the bottom of the pug-mill (in place of resting,

as heretofore, in a bearing or step at the bottom of the pug-mill), and in affixing to such shaft or axis (below the bottom of the pug-mill) a bevilled toothed pinion: the axis below the pinion is caused to rest in a support or step. The pinion affixed on the pug-mill axis takes into and gives motion to a bevilled toothed wheel on a horizontal shaft or axis; on which is fixed part of a toothed wheel suitably arranged (as is well understood) for gearing alternately into a toothed rack above and below; which racks are fixed to the pistons in the apparatus, such as has heretofore been used for forcing clay or brick-earth through moulding orifices.

The patentee claims, First,—the combining a screening apparatus with a pug-mill, in such a manner that the clay or brick-earth, in place of being fed directly into the pug-mill, is fed into a trough or receiver, and is forced therefrom by a piston through a grating or screen, so as to separate the stones and roots therefrom before the clay falls into the pug-mill; and, Secondly,—constructing the axis of a pug-mill in such manner that it may descend through the bottom of the pug-mill, and, by means of a pinion combined therewith, give motion to a bevilled toothed wheel on the axis, which gives motion to the racks which actuate the piston of the moulding apparatus.

To JOHN CLAY, *of Cottingham, in the county of York, Esq., for improvements in the manufacture of coal-gas.*—[Sealed 18th December, 1852.]

THIS invention relates to an improved mode of purifying ordinary carburetted hydrogen gas, and removing therefrom certain noxious gases, which materially impair its illuminating powers. The noxious gases, which require to be removed, consist principally of ammonia and sulphuretted hydrogen; and this object has hitherto been usually effected by causing the impure carburetted hydrogen gas to pass through a purifier or apparatus containing lime, or some other chemical agent having a strong affinity for the noxious gases above mentioned.

The patentee, instead of using lime alone, employs peat charcoal, in combination with lime or other matters, some of which have been heretofore used separately for similar purposes. These agents must possess the property of absorbing ammonia, sulphuretted hydrogen, and the other usual gaseous impurities of carburetted hydrogen.

The peat charcoal is made in the ordinary manner; and

when the peat has been converted, by burning, into charcoal, it is to be reduced to powder and mixed with common salt and pulverized iron ore, in the proportions of two parts of peat charcoal to one part of pulverized common salt and one part of pulverized iron ore. The ore should contain an oxide of iron; and that kind of ore known as the red hematite is preferred to be employed. These ingredients, when well mixed, are ready for use, and may be employed in precisely the same way as lime is now used in the dry-lime purifier. In some cases it is found desirable—according to the quality of coal that is used for the manufacture of the carburetted hydrogen gas—to employ lime, in combination with the other materials. This, however, is not absolutely necessary, and may be dispensed with in situations where the expense of lime would be an object worth saving. The product obtained from the purifier, when the materials are saturated with the gaseous impurities, may be used as a manure.

The patentee claims the use of peat charcoal, in combination with common salt and iron ore or oxide of iron, for the purification of coal-gas, as above described.

To George Stiff, *of Brixton-hill, Gent., for certain improvements in manufacturing paper.*—[Sealed 15th February, 1853.]

This invention of improvements in the manufacture of paper has reference to the treatment of various vegetable substances, to be employed in the formation of the pulp or body of the paper,—the objects being to effect a greater economy in the process generally, and to produce, readily and expeditiously, a description of paper applicable to all desired purposes.

In carrying out his invention, the patentee makes use of straw, or grass, "gunney bagging," and "hemp bagging,"—preferring, however, the employment of straw. When straw, grass, or vegetable fibre of any similar kind is employed, the first process made use of is to cut the straw or fibre into lengths of about half an inch,—which may be done in a chaff-cutting machine, or any similar apparatus heretofore employed for the purpose; after which, the straw or fibre is winnowed, by any suitable contrivance, in order to separate the knots and other portions of the fibre which could not be readily reduced to the consistency of pulp. The straw or fibre, thus prepared, or the gunney bagging, or hemp bagging, after having been suitably prepared, is placed in a boiler or vessel,

together with a sufficient quantity of clear water to cover the fibre or other material, and boiled for the space of one or two hours. This boiler or vessel is furnished with a partition or diaphragm, finely perforated, or composed of gauze or similar material, through which the water may be drained off from the fibre or other material, and carried away through a discharge-pipe, which is brought into connection with the lower surface of the boiler or vessel. After this process, the fibre or other material is to be immersed in lime-water, in the proportion of about 1 cwt. of lime-water to every 1 cwt. of material, and to remain so immersed for the space of about 24 hours, the mixture being occasionally stirred. After the expiration of this time, the lime-water is to be drained off, and a fresh solution poured on, which is again drained off, as before. When this operation has been continued during about three days, the fibre or other material is to be placed in water, to which alkali has been added, in the proportion of about 10 lbs. of alkali to every 1 cwt. of water, and boiled for the space of two or three hours; the alkaline solution is then drained off, in the manner before described. After the fibre or other material has been thus treated, it is washed and bleached in the same manner as when bleaching rags; that is to say,—by running it into tanks or vessels, with a quantity of chlorine or bleaching powder, sufficient to bleach it to that degree of whiteness which is required for the quality of paper to be made. After being thus bleached, the straw, or other fibre or material, may be washed and beaten, and reduced to pulp or half stuff, in the usual manner; and the pulp or half stuff may be converted into such paper as shall be required by the processes heretofore in use.

The patentee claims the substitution of lime-water for other alkaline solutions heretofore employed in the maceration of straw, grass, or other vegetable fibre, or gunney bagging, or hemp bagging, used to form the pulp or half stuff, in the manufacture of such descriptions of paper as are produced from the aforesaid materials.

To HERBERT TAYLOR, *of Mark-lane, merchant, for improvements in ornamenting surfaces or fabrics, applicable to various useful purposes; such as for covers of furniture, imitation tapestry, carpets, or hangings,—being a communication.*—[Sealed 9th April, 1853.]

THIS invention consists of an improved method of painting

or ornamenting cloths of all kinds, which have been previously prepared with a mordant that will combine chemically with the colors as they are laid on and blended one with the other. The invention further includes a method of developing and permanently fixing the colors thereon by steam, and restoring the cloth to its natural pliable and soft condition, by washing out the excess of coloring matter, and leaving the picture indelibly fixed in the cloth.

When painting on felt, or woven woollen goods, the cloth is first perfectly bleached, in the ordinary manner, with soap and sulphur. A tepid water-bath is then prepared, and to it is added a mordant (bi-sulphohydro chloride of tin), until the liquid weighs 3° Beaumé (acid weight). This mordant is composed of hydrochloric acid, sulphuric acid, and block tin, in about the proportion of 18 lbs. of the first, 9 lbs. of the second, and 2½ lbs. of the third. This solution is warmed in a sand-bath; and, while the heating operation is proceeding, chlorine gas is to be introduced, by a pipe or otherwise, to saturate the solution. In this mordant the cloth is placed, and allowed to remain about three quarters of an hour, when it will be sufficiently charged with the mordant to receive the chemical colors to be laid on or painted upon it, even when one color is laid on over the other, to the extent of several colors,—the mordant retaining its power of taking and holding the quantity of color necessary to give depth and richness to the picture. The cloth is now removed from the mordant and wrung out; the creases are next carefully shaken out, and the cloth is placed in a liquid, prepared with twenty parts cold water to one part of clear chloride of lime-water, at 2½° Beaumé, where it is allowed to remain about three minutes; after which it is washed in clean water and dried: this operation will prepare the fabric for receiving the colors. The colors used are chiefly vegetable; but some mineral and animal colors are also employed; and the various shades thereof are made by mixing the colors or reducing them with gum-water, prepared from the gums Arabic or Senegal, which should be well bleached or purified, and dissolved in water. By mixing or commingling the primitive colors, any other tints may be produced, according to the taste of the artist; and these mixed colors may be further reduced in shade by reducing with gum or other water. It should be remarked, that the mordant employed is colorless, and that cloth, as white as it can be made, should be used, so as clearly to shew the finest tints. The picture should be commenced by applying the lighter shades, and finished with the darker ones,—allowing one color to dry

before another is put over it. Great richness of color is said to be given, by this process, to the picture which is being painted on the cloth; whilst the mordant retains its chemical affinity for the colors, and fixes them permanently in the cloth successively as they are laid on.

The most expeditious and economical manner of putting on the figures or designs is to have the outline, or so much of the figure as may be necessary, lithographed and struck on to the cloth; by which means any number of copies, of the same design, may be produced, and the necessity of employing artists to sketch out the figures will be obviated; for, with a copy before the operator, and the outline established, the colors may be easily blended in.

For the purpose of sketching in the figures (when not lithographed), and for many of the sharper lines, a gold or common quill pen or style, a brush, and a small roll of felt or other cloth is used; and sometimes, for pressing or working in the colors more deeply into the cloth, a small piece of wood, ivory, or glass, which may be easily cleaned and not affected by the colors, is used.

After the figure, landscape, design, or ornament of any kind, has been fully painted on the surface, the cloth, being stiff with the gum and colors, must then be moistened by the application of damp cloths. The painted cloth is then rolled in a clean white cloth, and suspended in a steam-chamber, so that the rolls shall not touch each other, or the sides of the chamber. Steam is then let into the chamber, and the roll of cloth is left therein from 45 to 90 minutes, or in proportion to the bulk or size of the piece to be operated upon. This steaming may require one, two, or more separate operations; although, as a general thing for small articles, one will serve the purpose. When two operations are necessary, the rolls or goods should be turned upside down, or reversed end for end, to prevent the colors from running. This may be more economically done by machinery from the outside, as it may be found necessary to keep the rolls in continual motion in the chamber, and it would obviate the necessity of opening the chamber, or handling the hot rolls or goods while being steamed. After the painted cloths are properly steamed for brightening and fixing the colors thereon, they are taken out and exposed to the air for two hours, more or less, to dry, and to allow the blue and green colors to brighten by becoming re-oxigenated.

After the steaming and drying operation, the fabrics are allowed to lie in clear water until the gum therein dissolves;

after which they are dipped up and down in the water until the color ceases to run; and, for this purpose, a running stream of water is the best. When well washed or rinsed, as above, they are rolled in a clean white cloth, and beaten by the hand, or otherwise, to drive out the water; and if any color remains in the cloth it is washed and dried again, until the excess of coloring matter, or that which the mordant has not combined with, is entirely washed out. The fabric is brushed lightly with the grain of the cloth, and a piece of white paper is placed over it, and it is ironed with a moderately hot iron. The colors are now fully developed, and permanently fixed or set, and the article is ready for the market. Any ordinary steaming apparatus will serve the purpose, such, for instance, as that used for steaming worsted goods, merinos, cashmeres, and other similar fabrics. The chloride of lime-water is used to oxidate and combine the mordant of tin with the cloth.

The patentee claims the process of painting upon cloth previously prepared with a mordant, as herein described, that will combine chemically with the colors laid on, one over another, and blended as described; by which means great richness is given to the figures, whilst the tint of each is carefully preserved. He also claims developing and fixing, permanently, the colors by steam, and restoring the cloth to its natural pliable state by washing out the gum and excess of coloring matter, as herein described.

To WILLIAM EDWARD NEWTON, *of the Office for Patents,* 66, *Chancery-lane, civil engineer, for improvements in the manufacture of paper,—being a communication.*—[Sealed 22nd November, 1852.]

THIS invention of improvements in the manufacture of paper is thus described:—It is well known that a fac-simile copy of any writing with ink, chemically prepared for the purpose, and known as copying ink, can be produced by pressing such writing upon a damped sheet of bibulous paper of the kind known as copying paper. Such copies heretofore have been liable to many objections;—first, the paper on which they are made is so tender that it is liable to tear so much that, when damp, it can only be handled by exercising great care; and, second, the writing of the copy is more or less blurred, the lines having indistinctly defined edges, like writing or blotting-paper. Moreover it is a matter of great inconvenience to be

obliged to use a particular kind of ink for writing which requires to be copied: because the ink usually employed for that purpose is not suitable for writing in ledgers and other books, as writing made with it on one page will mark the opposite one, and thus produce confusion. And, besides, when two kinds of black ink are on the desk, the writer is apt, occasionally, to dip his pen inadvertently into the common ink; and as so much of his letter as happens to be written therewith will not copy: this circumstance often renders copies imperfect.

Now this invention consists of a new combination or intermixture of fibrous substances, to give to the paper the requisite mechanical properties; while to give it the desired chemical properties, it is impregnated with a mordant or other matter which some substance in common ink will act upon chemically, so as to develope and fix a color; and, in this way, dyeing a copy of the original writing upon the copying paper, by using the original letters, as both types and ink. Thus this process is analogous to that by which calico is printed.

The fibrous ingredients of which the paper is composed are manilla fibre, such as is commonly employed for making cordage, and cotton fibre, and any other fibrous substances that may be found to possess the same relative properties, as constituents of copying paper. The chemical ingredient or mordant which is preferred to be used, is copperas or sulphate of iron, which is dissolved in water, and then mixed with the paper pulp during the process of making the paper. Though copperas is preferred for impregnating copying paper, the patentee does not intend to confine himself thereto, as there are many other substances that could be used,—the object of the invention being to make a chemically-prepared paper, upon which writing with common ink will make an impression, so as to reproduce a copy itself, so to speak.

In the manufacture of this new quality or description of paper, the manilla and cotton are to be used as substitutes for the fibrous materials hitherto employed in the production of bibulous paper, and the process of manufacture may be the same. The relative proportions of the manilla and cotton composing this paper, may be varied according to the quality of either material, or as other circumstances may suggest: the general proportions however, which are preferred, are equal parts of each; as these substances, when combined, form a strong copying paper, somewhat resembling parchment in strength and appearance, particularly adapted to the transference of ink and other colored impressions, by

means of pressure, as is now done by the ordinary copying press in transferring a copy of writing from sized to unsized absorbent paper, suitably moistened or damped. The paper produced by the combination of manilla and cotton possesses many advantages over the ordinary paper for copying, inasmuch as that a stronger paper may be employed, and a fairer and more indelible impression produced thereon. These results are derived from the natural properties of the manilla and cotton when combined; as the powerful bibulous peculiarities of both these substances, when damped, serve effectually to absorb or receive the ink or other impression, and the contractile property of the manilla, in drying, serves to give a sharp outline to the impression, and prevents the running, or spreading, or blurring of the ink, while the flexible nature of the cotton neutralizes the hardening tendency of the manilla in drying,—the peculiar property of the fibre of the manilla grass being to shrink excessively in drying, and to stiffen or harden. Thus the highly bibulous character of the manilla, when damp, from its expanded and spongy texture in that state, causes it powerfully to absorb the ink in copying, and its excessive contraction, when drying, condenses the color and renders the impression sharp and well defined. As before observed, the cotton neutralizes the hardening tendency of the manilla, in drying, and thereby keeps the paper flexible, and prevents it from cracking or breaking, which are the purposes the cotton is intended to serve. This combination of manilla and cotton may be made stout or thin, as desired. Owing to the highly bibulous character of the manilla, it will require less pressure to produce an impression upon it than is necessary to produce one on ordinary copying paper; and as ink will not spread or run on this as in the common copying paper, it can be written upon by the pen: this property greatly increases the convenience and practical value of the improved paper.

The patentee remarks, that other fibres than manilla may be employed,—those of the cocoa-nut husk having also the peculiar properties of the manilla fibre to a greater or less extent, and may be used as a substitute for it in the manufacture of the parchment copying paper; but the manilla is preferred.

To manufacture the chemical paper, the paper pulp is prepared of any material suitable for making bibulous paper in the common way, preferring, however, pulp made of manilla and cotton: a solution of any substance that will not color the paper, and will, at the same time, be colored by the con-

tact of ink, is then mixed with the pulp. The quantity of chemical matter should be the least that can produce the proper effect, which, of course, will depend upon the kind of ink used, and the nature of the mordant and coloring matter in the paper and ink respectively with which it is proposed to reproduce or copy the writing. 1 lb. of copperas is sufficient to impregnate 100 lbs. of paper pulp for copying writing with Maynard's ink; but it is too little for copying writing with some inks, and more than is required for copying writing with others. The proportion of the chemical to the fibrous matter must, to a certain extent, be left to the judgment of the manufacturer of the paper; as he will, of necessity, have to vary it to adapt paper to the different kinds of ink in use in different places where his paper is sold.

The patentee claims the manufacture of copying paper as herein described, composed of manilla fibre, or the equivalent thereof, tempered with cotton, substantially as herein set forth; and impregnating bibulous paper, in any convenient way, with some one of the substances above indicated, upon which common writing ink will act chemically, as described, for the purpose above set forth.

To James Curtis Booth, *of the city and county of Philadelphia, in the State of Pennsylvania, United States of America, chemist, for an invention for manufacturing chromate and bichromate of potash from chromic iron or chrome ore.*—[Sealed 9th November, 1852.]

This invention consists in reducing the oxide of iron in chrome ore, either wholly or in part, by means of carbon, in any of its several forms, or by means of any of its compounds, which are or may be employed as fuel,—such as carbonic oxide, carburetted hydrogen: this operation forms the first stage of the manufacture. The second operation consists in removing, by means of sulphuric acid, the iron that has been reduced by the first part of the process. The remainder of the process of manufacture is similar to that which is now in use; namely, to heat the residue obtained by this improved process, in contact with carbonate of potash, and either with or without saltpetre.

In carrying out his invention the patentee takes the ore known as chromic iron or chrome ore, and grinds it to a powder by the usual mechanical means. This powdered ore he mixes with about one-fifth of its weight of powdered charcoal, and places it upon the hearth of a reverberatory furnace, con-

structed as the reverberatory furnaces for re-heating or puddling iron are ordinarily constructed; that is to say, in such a manner that the heat or flame may be as free as practicable from uncombined oxygen or atmospheric air. By this operation the greater part or all of the oxide of iron in the chrome ore will be decomposed, and the iron reduced to the metallic state. When one charge of the mixture has been reduced, as above described, it is to be raked out, and a second charge of the mixture must be introduced into the heated furnace, reduced in its turn and replaced by a third charge, and so on. Each charge, when raked out of the furnace, is to be thrown into vats containing dilute sulphuric acid, whereby the iron is dissolved and a solution of proto-sulphate of iron or copperas is thereby formed. This solution (still containing free acid) is to be drawn off and run upon a fresh charge of reduced ore, in order, more fully, to saturate the free acid; after which it is again to be drawn off, and evaporated to crystallization, so as to produce copperas in a state adapted for commerce. The residue in the vats is then to be well washed with water and dried, and afterwards mixed with carbonate of potash, or with carbonate of potash and saltpetre, and heated in the same manner that the chrome ore itself is heated in the process usually employed.

The following are the advantages of this improved process:—By the ordinary method of manufacturing chromate and bichromate of potash, only a portion of the oxide of chrome is oxidized, and consequently only a portion of the materials is converted into chromate of potash by a single heating: it will be seen that repeated heatings, with fresh portions of potash, will be required to complete the process. These repeated heatings with potash involve a considerable loss of potash by volatilization; but, by the employment of this improved process, the first heating with carbonate of potash converts all or nearly all the oxide of chrome into chromate of potash, and thus much of this loss by volatilization of the potash is avoided. The production of copperas, incidental to the improved process, also assists in defraying the expense involved in carrying out the improvements. The quantity of oil of vitriol employed in this improved process is nearly equal in weight to about two-thirds of the weight of the ore itself.

The patentee remarks that, instead of powdered charcoal, as previously mentioned, coke, anthracite, or bituminous coal, or any other carbonaceous fuel or carbonaceous materials, may be used; and instead of a reverberatory or other furnace, gas-retorts may be used.

The solution obtained by washing the residue of the ore, after the sulphate of iron has been produced, may be again economically used for diluting the acid, which is to be applied to remove another portion of iron from a succeeding charge.

The patentee claims, First,—the employment of carbonaceous materials in the reduction of chrome ore, as herein described, as a stage in the manufacure of chromtate of potash. Secondly,—the art or process of manufacturing chromate and bichromate of potash from chromic iron ore, by means of the reduction of the oxide of iron, and the removal of the reduced iron by the usual substances and modes. Thirdly,—the process of reduction and removal, herein described, in connection with the old process of reduction, or in combination with any equivalent therefor.

To BARNABAS BARRETT, *of Ipswich, sculptor, for improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and coloring the same.*—[Sealed 30th April, 1853.]

THIS invention relates to certain means of indurating stone, cement, plaster, and other like porous bodies, and thereby giving them the property to resist moisture, and also, in some cases, improving their appearance as well as increasing their durability.

It has hitherto been the practice in indurating stone, &c., to subject it to a very high degree of heat, in order to make the indurating substance penetrate and permeate through the material. This, however, has been found highly detrimental to the material under operation, and in many cases has failed to produce the desired effect. To remedy these evils it is proposed (in all cases where it is practicable), in applying these indurating mixtures, to enclose the stone or other materials to be operated upon in an air-tight chamber, and exhaust or partially exhaust the same; and then allow the indurating substance, whether hot or cold, to trickle down or flow into the chamber to fill the vacuum; the effect of which will be that the liquid indurating substance will readily find its way into the pores of the stone or other material, and become incorporated therewith.

Before subjecting the materials to this process of injection, they must be heated in a chamber or oven, to from 50 to 60°, for the purpose of driving out whatever moisture they may contain; and as the process greatly increases the natural

tenacity of the materials submitted to such treatment, the articles should be worked or fashioned to their required form before being thus operated upon.

When the materials or works of art require to be colored, they are stained with any suitable vegetable or mineral color, by laying the same on with a brush, and allowing the color to dry before commencing the indurating process.

Mixture No. 1.—The composition of this solution is as follows:—56 parts, by weight, of sulphur, dissolved by the aid of steam heat or dry heat, in 44 parts of dilute vinegar or acetic acid, containing 17 parts of acid to 8 of water.

In preparing indurating mixtures, to be applied to the exteriors and interiors of buildings, whether possessing a surface of brick, stone, cement, or plaster, the following ingredients are employed:—

Mixture No. 2, contains shellac, 14 parts, by weight; seed-lac, 14 parts; coarse turpentine, 1 part; pyroligneous spirits, 40 parts.

Mixture No. 3, is composed of gutta-percha, dissolved in coal-tar, naphtha, or other suitable solvent, in the proportion of 3 parts, by weight, of gutta-percha, to 8 parts of the solvent.

Mixture No. 4. The proportions and ingredients of this mixture are as follows:—To 1 bushel of limestone or chalk add 12 gallons of water and 12 lbs. of alum, half a gallon of beer grounds and half a gallon of gall, and mix the same well together. If it is desired to color the mixture, this may be done by adding thereto pitch, or vegetable or mineral colors. These solutions, when made lukewarm, may be laid on with a brush, until the surface treated will absorb no more. Works of art, blocks of stone, and other detached porous materials of the kind specified, may also, with advantage, be indurated by the use of these mixtures.

The patentee claims, hardening and coloring natural and artificial stone, and articles composed of porous cements or plaster.

To John Webster, *of Ipswich, for improvements in treating animal matters, and in manufacturing manure.*—[Sealed 9th February, 1853.]

Heretofore, in the process of "rendering" and treating the rough fats of animals, a considerable product is obtained from some fats called "greaves," such rendering and treating being carried on by heat. Now, this invention consists in subjecting the rough fats of animals to the action of dilute sulphuric

acid, and boiling the same, by which the animal matters other than the fats combine with the acid, and, when allowed to stand, subside, and the fatty matters may be run off and washed,—any remains of acid therein being neutralized by chalk. The acid and animal matters are then used to dissolve bones or mineral phosphates for making manures, in place of sulphuric acid, which has not been previously used; by which double use of the acid a great benefit will be derived, and the rendering and treating the rough fats of animals improved.

In order to separate and purify the tallow from rough fat kitchen-stuff, whale-blubber, or any other fatty animal matter, the patentee takes at the rate of 30 lbs. of ordinary commercial sulphuric acid (of specific gravity 1.80), and adds to this eight gallons of water, and immerses in the solution 168 lbs. of the rough fat or matters above mentioned: these matters he then boils by the aid of streams of hot air forced into it, or by an ordinary fire, till the tissues are entirely broken up. The matters are then allowed to stand, and when they have settled, the tallow may be drawn off and washed with hot water till the acid is removed,—1 lb. of chalk being added just before the washing process is completed. The acid liquor may now be used again in operating upon a like quantity of rough fatty matter, until the tissues held in supension in it affect the color of the tallow produced.

The liquid is now to be used for the manufacture of manure, by combining it with bones or mineral phosphates, in like manner to that now practised with sulphuric acid; by which means the animal matter taken from the fats by the acid is rendered useful, and the acid also.

The patentee remarks that he is aware that sulphuric acid has before been used for obtaining tallow and purifying oils by acting on rough fatty and oily matters; he does not therefore claim the same generally. He likewise observes that the use of sulphuric acid for such purposes has heretofore been more costly than when working according to this invention, by reason of the animal matter being wasted, and also by reason of the acid being diluted by the use of free steam in boiling the fatty matters and acid; whereas, by this invention, the use of free steam is avoided, and the diluted acid is used of such a strength as to admit of its being employed on several quantities of fatty or oily matters, and then, together with the animal matters separated by the acid: the acid is beneficially used in acting on bones and mineral phosphates in the production of manure.

To Louis Gervais Dieudonné Buffet Delmas Ducayla, *of Bordeaux, in the Empire of France, Esq., for an improved manufacture of artificial fuel,—being a communication.*—[Sealed 21st May, 1853.]

This invention relates to an improved artificial fuel, and is composed of the following ingredients:—1st, cinders or ashes. 2nd, wood or lignite. 3rd, anthracite coal. 4th, pit coal. 5th, animal black. 6th, calcareous earth or clay. 7th, mould, or loam, or peat earth. 8th, sea mud. 9th, fresh-water mud. 10th, sea weed. 11th, sea salt. 12th, common salt. 13th, nitrate of lead. These ingredients, or the principal part of them, will, when combined together, either with or without other substances, form the improved artificial fuel, and must be well mixed, and may be combined in various proportions, according to circumstances; such, for instance, as the purpose for which the fuel is to be employed, or the relative value of some of the materials, which may be cheap in some localities and dear in others. When well mixed, the materials may be made up into round or oval balls, of any convenient size.

In localities which are near the sea the patentee takes of pelisse (a species of sea-weed found on the coast of Normandy) one-third part, and of the sea-weed known as sea-wrack or *fucus maritimus*, one-third part, and to these nitrate of lead is added, in the proportion of 4 lbs. of nitrate of lead for every 2000 lbs. of the above ingredients. Or, for other localities, he takes of calcareous earth, or fresh-water mud, one-third part;—the other two-thirds being composed of any of the following ingredients, viz., pit coal, lignite, sulphuric ashes, and anthracite, mixed in any desired proportion, according to the purpose for which the fuel is to be employed. Vegetable earth is only employed in the absence of mud and calcareous earths; but it may, if required, serve as a binding material, and be employed in the same proportion as the other ingredients.

Animal charcoal and salt are only employed in the proportion of one-hundredth part, and serve to give greater activity and intensity to the flame.

After the ingredients above mentioned have been mixed together, in the proportions above indicated, they must be moulded into either spherical or oval balls, which are found to be the most suitable forms for facilitating combustion, and also for rendering it of longer duration. Moulding the ingredients into these shapes, therefore, forms one of the es-

sential features of the invention. These balls may be made of any convenient size, according to the use to which they are to be applied; such, for instance, as to be consumed in the furnaces of marine engines, for manufactories, or for domestic purposes.

Scientific Notices.

INSTITUTION OF CIVIL ENGINEERS.

November 8th, 1853.

JAMES MEADOWS RENDEL, Esq., President, in the Chair.

The paper read, on this the first evening of the session, was, "*On the speed and other properties of ocean steamers, and on the measurement of ships for tonnage.*"—By Mr. A. Henderson, Assoc. Inst. C.E.

The two subjects were combined, for the purpose of affording facility for their discussion.

After alluding to a paper brought before the Institution, in 1847, by the same author, in which the fallacy of using registered tonnage and nominal horse-power, as the index of the capabilities or speed of steamers was shewn, by a comparison of their relative proportions and elements of resistance with the steam-power employed—the present paper referred to a tabular form, containing copious details of dimensions and of general information, as to the form, proportions, and speed, realized by ocean steamers, compiled from documents, emanating from the department of the Surveyor of the Navy, and from returns made to Parliament by the Post-office and Admiralty; shewing that, between the years 1845 and 1851, on an aggregate mail service of 1,271,000 miles, the speed realized, only averaged 7·945 knots per hour, which was far short of the speed generally supposed to be maintained by mail steamers; the highest speed being 8½ knots per hour, between Marseilles and Alexandria, by H.M. mail packets; and the lowest 7¼ knots per hour, between Ceylon and China, by contract steamers.

Reference was then made to a tabular statement, published by the Committee on Steam Communication with India, shewing the station of each steamer, including six packets of the Indian navy, running upwards of 325,000 miles, at a speed of 8·082 knots per hour, and eleven contract steamers of the Peninsular and Oriental Company, running above 533,720 miles, and averaging 7·972 knots per hour. By the same table the speed of the iron steamer "Pekin" was shewn to be 7·733 knots per hour;—the older timber steamers, "Lady Mary Wood" and "Braganza," realizing only 7·378 knots and 7·249 knots per hour respectively.

Some observations were offered, on the various proportions, forms, and resistance of ocean steamers, and the difficulty of obtaining a fair criterion of relative efficiency; with suggestions, that the information might be obtained by recording the particulars required, in the columns of a table, similar to one which was exhibited, from which it appeared, that the proportions of vessels varied from five and a quarter, to eight times their breadth to their length. That the length of the five steamers realizing $8\frac{1}{2}$ knots per hour, averaged less than six times their breadth; while that of those which realized less than $7\frac{1}{2}$ knots, averaged upwards of $7\frac{1}{2}$ times their breadth.

Reference was made to the "Oronooco," one of the largest new steamers, the particulars of which afforded much useful information, and which, if similarly collected from other sources and deposited in the archives of the institution, would be most valuable, as the subject was daily becoming of greater interest and importance.

The second part of the paper was "*On the measurement of ships.*"

By the old law, or builders' measurement, the length (less 3-5ths of the breadth), multiplied by the breadth, and the product by half the breadth, and divided by 94, gave the registered tonnage. By an Act passed in 1836, and amended in 1845, a rule was adopted, based on the internal measurement of eleven breadths, and four depths, taken at three sections; the divisor 3,500 giving the registered tonnage.

It was contended, that the present register of particulars, by omitting the depth, gave less information than the old register; that calculations of tonnage deduced from internal measurement, must shew discrepencies of ten, or even fifteen per cent. between the computed tonnage of timber and of iron ships, of the same size or external bulk; therefore it had become necessary to introduce a method of computation, deduced from both internal and external measurement, so as to combine the capacity for stowage, and the weight of the load, and the displacement. The principle being to ascertain the external bulk and internal space in cubic feet, and to deduce from the mean of these, by the use of a factor 30, 31, or 32, a register of tonnage approximating to the old law, chiefly for statistical purposes;—the external and internal dimensions in cubic feet giving the only correct definition of the size, capacity, and resistance of a vessel.

In 1849, the Tonnage Committee, including Mr. Parsons and Mr. Moorsom, reported, that the equitable basis for charges was, that of the entire cubical contents, measured externally; adopting a mode originated by Mr. Parsons, of taking curves of areas of vertical sections, measured externally to the height of the upper deck; but these views were opposed, on the ground that iron vessels had much greater internal capacity than timber vessels of the same external measurement, and also on the assumption,

that light or measurement goods, exceeded in amount heavy goods, or dead weight; whereas, from the trade returns, No. 51, of 1850, it appeared, that of the total imports and exports amounting to 10,760,217 tons, there were 7,483,214 tons of heavy goods, and 3,277,003 tons of light merchandise,—thereby shewing, that a system combining external and internal measurements, would be the most equitable.

Mr. Moorsom proposed a mode of computing the internal capacity, without the aid of diagrams, or curves of areas, and of ascertaining the tonnage by dividing by 100 as more convenient. This new rule did not, however, give the burthen the vessel would carry, but merely the tonnage for an assessment of dues.

From both these propositions the author of the paper dissented; considering it inexpedient to alter the present law, except to obtain a rule, that should secure a correct mensuration and description of all kinds of vessels, so recorded on paper, as to give the size, form, and construction of the vessel. The plan he proposed, would afford the means of correcting the measurement of sections, and would give facilities for forming a scale of displacement, and curves of internal areas, from which the weight of cargo, or capacity for light goods, could be obtained. Vessels being sold, and often freighted, at a price based on their bulk and capacity, and the materials, fittings, masts, sails, and engines, being all more or less regulated by these two qualities, it was expedient they should both be recorded on the builders' certificate, to be used whenever required by the officers usually employed in surveying ships, provided the mode of measurement and record were properly defined, exemplified by plans, and authorized by law.

The practicability of effecting this was shewn, by the exhibition of a *pro formâ* certificate of survey of a vessel, such as was proposed to be substituted for the usual builders' certificate, now required for registry; the directions for the measurement of the sections, and for striking the curves of areas, were given, and exemplified by diagrams, together with the rule and the processes of computing the external bulk and the internal space; the displacement and registered tonnage being thus given, for three several vessels, built of timber only, of wood planking and iron frames, and entirely of iron; shewing greater internal capacity of the two latter, as compared with the former.

By a specification of the materials for these three vessels, the weight of the hull of a timber ship was shewn to be 184 tons; that of iron 148 tons, and of iron frames and wood planking 158 tons;—the latter being represented as an arrangement of materials, by which the author proposed to obtain the lightness and capacity of an iron ship, without the danger of corrosion and of undue action on the compasses.

These propositions, like Mr. Moorsom's, had been submitted to the Board of Trade, with the view of suggesting the reorganization of the Tonnage Committee, and the addition of members

connected with shipping and scientific societies; so as to promote free discussion, and the diffusion of information; and to obtain experience, conducing to the improvement of the mercantile marine, fishing-boats, and life-boats.

The necessity for the co-operation of all engaged in maritime enterprise, was urged from the experience of the limited improvement, hitherto made in fishing-boats and life-boats; reference being made to the circumstances of the failure of the prize model life-boat. The paper concluded with a proposition, that the Admiralty should provide each coast-guard station with one of their model life-boats, and that a mercantile marine association should be formed, for the prevention of loss from shipwreck,—a result which could only be attained by the improvement of the forms and fittings of vessels and boats.

November 15th and 22nd.

The discussion upon the paper on "*Ocean Steamers,*" by Mr. Andrew Henderson, Assoc. Inst. C.E., was commenced, by quoting from an article in the *Edinburgh Journal,* by Professor Tenant, of St. Andrew's, the dimensions of some of the large ships built by the ancients; whence it appeared, that a ship constructed by Ptolomœus Philopater, was 420 feet long, 56 feet broad, and 72 feet high from the keel to the prow; and was manned by four thousand rowers, four hundred servants, and two thousand eight hundred and twenty marines.

Hiero, king of Syracuse, caused to be built, by Archais, the Corinthian shipwright, under the supervision of Archimedes, a vessel which appeared to have been armed for war, and sumptuously fitted for a pleasure yacht, and yet was ultimately used to carry corn; the dimensions were not recorded; but as there were twenty banks of oars, three masts (the timber for the mainmast, after being in vain sought for in Italy, being brought from England), and the cargo of sixty thousand measures of corn, besides vast quantities of provisions, &c., for the crew, the dimensions must have exceeded those of any ship of the present day: indeed, Hiero, finding that none of the surrounding harbours sufficed to receive his leviathan, loaded it with corn, and presented the vessel, with its cargo, to Ptolemy, king of Egypt. On arriving at Alexandria, it was hauled ashore, and nothing more is recorded respecting it.

Taking these dimensions as the basis for calculating the tonnage, by the old law, or builders' measurement; and, in accordance with the report of the late Tonnage Committee, taking the average tonnage of ships as amounting to twenty-seven hundredths of the external bulk, measured to the medium height of the upper deck,—the burthen and cubic contents of these vessels would be:—

	Tonnage.	External Bulk.
Ptolomœus Philopater's ship	= 6,445 tons,	830,700 cubic feet.
Noah's ark	= 11,905 „	1,580,000 „

and contrasting with these a few modern ships:

Great Western ...	= 1,242 tons,	161,100 „
Great Britain ...	= 3,445 „	446,570 „
Arctic (American packet)	= 2,745 „	356,333 „
Hymalaya	= 3,528 „	457,332 „

and, calculating by the same rule, taking the dimensions given in the prospectus of the Eastern Steam Navigation Company, their

Proposed iron ship .. = 22,942 tons, 2,973,593 cubic feet

It was, however, stated that this vessel was intended to be 10,000 tons register, which might be correct, if it were built on the cellular system, and was measured internally, by the present law. This latter example was only given, to demonstrate the advantage of adopting the proposed system of using the mean of external and internal measurement as the basis of the calculation of the tonnage, and of recording all the dimensions, and the scale of burthen, on the certificate of survey.

It was admitted, that there was much ingenuity in the proposed system of descriptive measurement, but it was argued, that the present law rather favored the construction of well-formed vessels, as the fiscal tax fell lighter upon them than upon bad ships. The utility, in a scientific point of view, as well as commercially, was strongly urged, of adopting a system of measurement, which should record the dimensions, capacity, and scantling, and form a classification of the comparative merits of all ships.

It was suggested, that the discussion would be more useful if it were, for the present, confined to the consideration of the advantages and disadvantages of the proposed large classes of sailing ships and steamers, with respect to their scientific construction, their capabilities for navigation, and their commercial economy; as the law of measurement could scarcely be combined with these questions.

The first point then considered, was the effect of heavy seas upon vessels of 400 to 600 feet long. The waves of the Atlantic were stated, by some captains of American "Liners," to attain an elevation of about 20 feet, with a length of 160 feet, and a velocity of 25 to 30 miles per hour.

Dr. Scoresby, in his paper on Atlantic waves, gave about the same elevation, for the waves, in rather a hard gale a-head. On one occasion, with a hard gale and heavy squalls, some few waves attained a height of 43 feet, with a length of nearly 600 feet, and a velocity exceeding 30 miles an hour. Other authorities assumed even more than those heights and distances.

The amount of strength, to resist the impact of such waves, must vary with the length and size of a ship, and the materials of which it was constructed; and as the experience of the Britan-

nia Bridge shewed, that a weight of 460 tons, at a velocity of 30 miles per hour, could be borne by a cellular tube of 460 feet span, it was demonstrated, that by the use of iron, almost any amount of strength could be given to a vessel; and as stability could be imparted by proper proportions, efficient vessels could be built of any dimensions, as had been exemplified by the "Great Britain," which, after remaining ashore on rocks for several months, had been got off without serious injury. There were, however, objections to the use of iron alone for vessels; therefore many other systems had been essayed, such as all English oak, pine of large scantling, three thicknesses of diagonal planking, and iron framing with stout planking: this last combination, with the addition of fore and aft ties and watertight bulkheads, was advocated for efficiency and economy.

The proportions of about six breadths for the length, were insisted upon, and it was noticed, that these were given as the dimensions of Noah's ark, as recorded in Holy Writ.

The effect of heavy waves upon vessels of great length when in the trough of the sea, and without sufficient "way on" to enable the rudder to act, was discussed. Under such circumstances it was suggested, that there might be a bow rudder, and a propeller so placed as to assist the action of the helm in bringing the vessel round.

The necessity for the formation of capacious docks and harbours expressly for such large vessels, was pointed out, as until that was done, they must load and discharge in the river or roadstead.

It was admitted, that the proposed record of construction would be of scientific value; but the advantage of making it a part of the ordinary register was questioned.

The full consideration of the best forms of fishing and life-boats, which had been incidentally mentioned, was strongly urged, on scientific and humane grounds.

The questions of what were, scientifically, the limits of bulk of vessels, and power of engines, and commercially, the most profitable dimensions for carrying cargoes and passengers, bearing in mind the period of inactivity, whilst loading in port, were shewn to be the main points for useful consideration; as it was as much the province of the engineer to consider the commercial result, as the details of execution of any proposed construction or plan of operations.

The innovations proposed by Mr. Roberts, and illustrated by his models, were examined.

An examination was made of the project for transmitting letters between Holyhead and Dublin, at a speed of 22½ statute miles per hour;—of that for communicating between New York and Liverpool in six days, at an average speed of 22 nautical miles per hour;—and for steaming to Calcutta and back, without re-coaling; traversing a distance of about 25,000 nautical miles, at an average speed of 15 nautical miles per hour; using elaborate calculations and tabulated results, based on the duty performed

by H.M.S. "Rattler," with a given power, and under known conditions.

Objections were raised to accepting $7\frac{1}{2}$ knots per hour as the data for the present average rate of speed of ocean steamers. It was urged, that such an average must have been derived from the voyages of steamers of old date, and without regard to the later results deduced from the performances of the Cunard and the Collins' lines of steam-ships.

The propriety of taking the "Rattler" as a model steamer was questioned; especially as the data were not given for selecting that vessel; it being argued, that the "Rattler" had not performed a series of long voyages, under every variable line of immersion, or under such changes of weather and states of the sea, as to furnish data for such important deductions.

The advantage of increasing the proportion of length to breadth was apparent, if it were admitted, that the cargo-bearing capacity of a vessel was thus augmented, without materially affecting her direct resistance through the water; supposing her midship section to remain unaltered. The proper proportion of length to breadth for an efficient ocean steamer was, however, an intricate question. Taking the "Wave Queen" as an example: the length of that vessel had been stated to be thirteen times her beam. Now such proportions might answer well for the river Thames, and a great speed might be attained; but such a vessel would, under certain circumstances, be unfit to navigate the British Channel. The same might be said of the American river steamers, which were reported to have attained almost fabulous rates of velocity; but such proportions as theirs, if attempted in ocean steamers, would only induce failure and loss of the vessels in valeyn sight he open ocean.

NOVA SCOTIA PATENT LAWS.

[For the following Abstract we are indebted to the "Scientific American."]

Synopsis of the New Act of the General Assembly of the Province of Nova Scotia, relative to Patents for Inventions.—Condensed by P. Stubbs, *Barrister, Attorney-at-Law, and Notary Public of St. John, N.B., B.N.A.*

Sec. 1. A resident of Nova Scotia for one year may apply to the Governor, alleging that he has discovered any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement thereon, previously unknown; and the Governor may direct letters patent to be issued, granting to the person so applying, and his representatives, for a term not exceeding fourteen years, the exclusive right of making, using, and vending his discovery. Letters to be recorded by the Provincial Secretary, in a book to be kept in his office for that purpose.

Sec. 2. Where letters patent are thus granted, and another person shall discover any improvement in the principle or process of such invention, and shall obtain letters patent for such improvement, the person obtaining the new patent shall not make, use, or vend the original invention, nor shall the original patentee make, use, or vend the improvement.

Sec. 3. Simple change of form or proportions of any machine or composition of matter, not deemed a discovery.

Sec. 4. Applicants for letters patent to pay in the Secretary's office twenty shillings.

Sec. 5. Any person may obtain copies of letters patent at sixpence per folio, and drawings obtainable also at a reasonable fee.

Sec. 6. Applicant for letters patent to make oath that he believes that he is the true inventor or discoverer, and that his use, invention, or discovery was not previously known in the Province.

Sec. 7. Before letters patent are granted, applicant to deliver a full description of his invention or discovery, and the manner of using, or process of compounding the same; and in case of a machine, to deliver a model, and explain the principles by which it may be distinguished from other inventions; and shall accompany the same with drawings, when the case admits of drawings, or with specimens of ingredients sufficient for the purpose of experiment. The whole to be filed or lodged in the Secretary's office; and copies of description are evidence in a Court of Justice when certified by the Provincial Secretary, where matters concerning such patents may come in question. The Governor may dispense with the delivery of a model at the Secretary's office.

Sec. 8. The patentee may assign letters patent, and the assignee then stands in the stead of the patentee, as well as regards his rights as his liabilities. Assignment to be recorded in Secretary's office.

Sec. 9. Actions maintainable for pirating patents, and damages recoverable.

Sec. 10. Defendant may plead the general issue, and give this act in evidence, and every special matter, to prove that the specification does not contain the whole truth, or contains more than is necessary to produce the described effect; and, upon further proof, that concealment or addition is fraudulently made, or that the invention or discovery is not original, or that such patentee had surreptitiously obtained his letters patent, then the verdict and judgment shall be for the defendant, with costs, and such letters patent shall be declared void.

N.B. It would appear that any person, whether a British subject or not, can take out letters patent in Nova Scotia, and all applicants are liable to the same expense; but in any case, the applicant must have resided in Nova Scotia for twelve months prior to the date of his application. This was formerly the case in New Brunswick.

LIST OF GRANTS OF PROVISIONAL PROTECTION.

[*Cases in which a full Specification has been deposited.*]

2420. André Alexandre Beaumont, of Paris, for a system of production of caloric, with or without combustible material.—[*Dated October* 19*th.*]

2440. Frederick Albert Gatty, of Accrington, for improvements in printing or producing colours on textile fabrics.—[*Dated October* 21*st.*]

[*Cases in which a Provisional Specification has been deposited.*]

1464. Jules Alexis Adrien Dumoulin, of Paris, for an improved instrument for measuring and tracing.—[*Dated June* 16*th.*]

1794. Samuel C. Lister, of Manningham, for improvements in machinery for washing wool and hair.—[*Dated August* 1*st.*]

1831. William Smith and Thomas Phillips, of Snow-hill, for an improvement in gas-stoves.—[*Dated August* 5*th.*]

1851. Thomas Young Hall, of Newcastle-upon-Tyne, for improvements in safety-lamps; part or parts of such improvements being applicable to the consumption or prevention of smoke, and for the purposes of ventilation generally.—[*Dated August* 9*th.*]

1861. Alexander Prince, of Trafalgar-square, for a press, applicable to the several purposes of lithography, autography, typography, chromo-lithography, or printing in colors, copper-plate printing, cylinder printing, embossing, and copying letters,—being a communication.—[*Dated August* 10*th.*]

1888. William Littell Tizard, of Aldgate, for a new combination, or new combinations, of materials suitable for buildings and other structures, and parts thereof, and machinery for producing the same.—[*Dated August* 12*th.*]

1923. Felix Alexandre Victor Delarbre, of Broad-street-buildings, for certain improvements in treating fibrous substances.—[*Dated August* 17*th.*]

1926. Thomas Grimsley, of Oxford, for improvements in machinery for the manufacture of bricks, tiles, pipes, and pottery.—[*Dated August* 17*th.*]

1949. Alexander Cuninghame, of Glasgow, for improvements in the manufacture or production of alkalis and their salts, or alkaline salts.—[*Dated August* 20*th.*]

1993. Samuel Taylor, of Manchester, for improvements in apparatus for generating and applying carbonic acid gas.—[*Dated August* 27*th.*]

2006. Charles Goodyear, of Avenue-road, St. John's-wood, for improvements in the manufacture of waterproof fabrics.—[*Dated August* 30*th.*]

2042. John Clare, jun., of Liverpool, for improvements in the construction of iron houses, vessels, masts, spars, smoke fun-

nels, boilers, cylinders, beams, and other like structures or articles.—[*Dated September 5th.*]

2054. Alfred Somerville and Charles Twigg, both of Birmingham, for improvements in pen-holders; and which said improvements are applicable to the manufacture of umbrella and parasol sticks, cornice poles, and other such like articles.—[*Dated September 6th.*]

2065. Robert Harrington, of Witham, for improvements in umbrellas and parasols.—[*Dated September 8th.*]

2072. Jonas Radford, of Cheltenham, for improvements in clocks or time-keepers.—[*Dated September 9th.*]

2156. Francis Birkin Newton, of Manchester, for improvements in the mode or method of cutting and making up garments, so as partially to dispense with seams or sewing.—[*Dated September 16th.*]

2242. Charles Coates, of Sunnyside, near Rawtenstall, for improvements in coupling pipes, and other articles, and in apparatus connected therewith.

2244. Edward Davies, of Bradford, Yorkshire, for improvements in carrier-combs to be used in combing wool, cotton, silk, flax, or other fibrous substances.

2246. John Hendry, of Glasgow, for improvements in ovens and apparatus for baking.

2248. Samuel Murland, of Castlewellan, Ireland, for certain improvements in machinery for preparing linen yarn.

2250. Adolphe Drevelle, of Halifax, Yorkshire, for improved apparatus to be used in connection with looms for weaving,—being a communication.

2252. William Brown, of Bradford, Yorkshire, for improvements in apparatus used in washing wool and other fibrous material.

The above bear date October 1st.

2254. John Wincoll Baxter, of Mistley, Essex, for certain improvements in ship building.

2256. James Coleman, of South-street, for improvements in the construction of compasses.

2258. William Henry Wilding, of Chesterfield-street, for improvements in propelling machinery.

2260. William Crofts, of Derby-terrace, Nottingham Park, for improvements in weaving.

The above bear date October 3rd.

2262. William Peace, of Haigh, for hewing and excavating coal, cannel, and other minerals, strata, and substances, by certain machinery and appliances thereto.

2264. John Norton, of Cork, for improvements in firing explosive compounds.

2266. Joseph Thomas Dodge, of St. Austell, Cornwall, for improvements in the formation and arrangement of, and mode of rigging and working, the sails of yachts, ships, and other vessels.

2268. Daniel Towers Shears, of Bankside, for improvements in brewing.

2270. James Lee Norton, of Ludgate-hill, for improvements in instruments or apparatus for measuring and indicating the distance travelled by carriages, and in the means of transmitting motion thereto from the running wheels.

The above bear date October 4th.

2274. James Thomson Wilson, of Falkirk, for improvements in the manufacture of alum.

2280. William Littell Tizard, of Aldgate, for improvements in thermometers and other like indicators.

The above bear date October 5th.

2282. Julius Schönemann, of Great Portland-street, for new constructions of weighing-machines,—being a communication.

2286. Alfred Ely Hargrove, of York, and Ralph Richardson, of Hartlepool, for improvements in machinery or apparatus for printing.

2288. William Geeves, of New Wharf-road, Caledonian-road, for improvements in the manufacture of bricks.

The above bear date October 6th.

2292. William Ellis, of Sheffield, for improvements in the manufacture and in the ornamenting of china, porcelain, and pottery wares.

2294. James Ferguson, of Glasgow, and James Lillie, of the same place, for improvements in trousers and similar articles of dress.

2296. Joseph Porter, of the Salford Screw-bolt works, for improvements in machines for drilling or boring metals or other substances.

2297. John Onions, of Park-terrace, and Samuel Bromhead, of Marlborough Estate, both of Peckham, for certain improvements in steam-engine boilers.

2298. William James Matthias and Thomas Bailey, of Seckforde-street, Clerkenwell, for improvements in obtaining power by mechanical means.

2300. Robert James Corlett, of Monmouth, for improved machinery for preparing or scutching flax and other fibrous materials requiring such an operation,—being a communication.

The above bear date October 7th.

2302. Alexander Edward Dudley Knox Archer, of Wharf-road, City-road, for improvements in apparatus for applying metallic capsules.

2304. Henry Kraut, of Zurich, for improvements in stands for casks and barrels.

2306. Henry Dubbs, of Vulcan Foundry, near Warrington, for certain improvements in the manufacture of wheels and tires, and also in the construction of furnaces employed in such or similar manufactures.

2308. George Lifford Smartt, of Enfield, for improvements in vessels for preserving leeches and fish alive.

2310. Henry Richardson Plimpton and James Leonard Plimpton, of Massachusetts, U. S., for a new and useful article of furniture to serve the purpose of a bedstead, a toilet table, or a washstand and a writing-desk.

2312. Henry Clayton, of the Atlas Works, Upper Park-place, Dorset-square, for improvements in the manufacture of bricks and tiles.

The above bear date October 8th.

2314. Robert James Mary6n, of York-road, Lambeth, for improvements in the construction of anchors.

2316. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in treating wool and fabrics composed of wool.

2318. George Fergusson Wilson, of Belmont, Vauxhall, for improvements in the manufacture of soap.

2320. Richard Archibald Brooman, of Fleet-street, for improvements in railway switches,—being a communication.

The above bear date October 10th.

2322. James Knowles, of Eagley Bank, near Bolton-le-Moors, for improvements in machinery for regulating the velocity of steam-engines and other motive-power engines.

2324. William Wilkinson, of Nottingham, for improvements in bands, belts, and straps.

2326. William Beardmore, of Deptford, and William Rigby, of Glasgow, for certain improvements in steam-engines.

2332. William Muir Campbell, of Glasgow, for improvements in earthenware kilns.

2334. William Henry Muntz, of Massachusetts, U. S., for a new and useful improvement in paddle-wheels for navigable vessels.

2336. John Francis Porter, of Bessborough-street, for improvements in the moulding of bricks and other articles of like materials.

The above bear date October 11th.

2338. George Frederic Goble, of Fish-street-hill, for improvements in apparatus for signalizing and stopping railway trains.

2339. John Morison and Daniel Hurn, both of Norton Folgate, for improvements in the manufacture of nose-bags.

2341. Patrick Clark and Alexander Clark, both of Gate-street, Lincoln's-inn-fields, for improvements in revolving shutters and other closures for portable and other buildings.

2342. Thomas Smith, of Lambeth, for an improved method of making pipes.

2343. Edme Jules Maumené, of Reims, for improvements in the treatment of lignite or wood coal, and in obtaining various useful products therefrom.

2345. Henry Mapple, of Child's Hill, and Daniel Moore Mapple, of Sidney-street, City-road, for an invention for electric tele-

graph purposes; being an improved printing and signal electric telegraph, with electric alarum attached.

2346. George Bradley, of Castleford, for improvements in stoppers or covers for bottles, and in the tools or apparatus for manufacturing the same.

2347. James Higgins, of Salford, and Thomas Schofield Whitworth, of the same place, for improvements in machinery or apparatus for spinning and doubling fibrous materials.

2348. Charles Scott Jackson, of Cannon-street, City, for improvements in preserving seeds, potatoes, and other roots.

2349. John Gibson, of Bloomfield-road, Paddington, for improvements in fixing tyre on railway wheels.

2350. Charles Scott Jackson, of Cannon-street, for improvements in preserving timber and other vegetable matters.

2351. Richard Jones and Charles John Jones, both of Ipswich, for improvements in fire-arms.

The above bear date October 12th.

2352. Henry Whitaker Butterworth, of Philadelphia, for an improved supplemental reflux valve for steam-engines,—being a communication.

2353. William Muir Campbell, of Glasgow, for improvements in potters' or earthenware kilns.

2354. Robert Popple, of Beverley, and Henry Woodhead, of Kingston-upon-Hull, for improvements in machinery for slubbing, roving, and spinning cotton and other fibrous substances.

2355. John Elce, of Manchester, for improvements in machinery for preparing and spinning cotton and other fibrous substances.

2356. William Robinson, of Manchester, for improvements in machinery or apparatus for manufacturing or forging iron or other metals into screw-bolts, nuts, rivets, pins, studs, or other similar articles.

2357. Sir John Scott Lillie, of South-street, for improvements in machinery for breaking stones and other hard substances.

2358. John Thomas Way, of Holles-street, Cavendish-square, for improvements in making and refining sugar, and in treating saccharine fluids.

2359. Abraham Pope, of Edgware-road, for improvements in furnaces.

2360. Joseph Piper, of Shoreditch, for improvements in apparatus for affixing adhesive stamps and labels.

2361. Charles Ludovic Augustus Meinig, of Leadenhall-street, for improvements in galvanic batteries.

2362. Thomas Grahame, of Hatton Hall, Wellingborough, for improvements in building ships and other vessels.

The above bear date October 13th.

2365. Samuel Bromhead, of Marlborough Estate, Peckham, for improvements in emigrants' and other portable houses and erections, and hinges of metal suitable for all purposes requiring hinges.

2366. Andrew Mc Lean, and William Fraser Rae, both of Edinburgh, for improvements in apparatus for the manufacture of aerated liquids.
2367. William Ridgway, of Hanley, for improvements in the construction of ovens and kilns.
2368. Mary Ann Davy, of Homerton, and Ann Taylor, of Islington, for improvements in the mechanical application of brushes.
2369. William Palmer, of Brighton, for certain improvements in ventilating.
2370. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for preparing and combing wool,—being a communication.
2371. John Farrell, of Stangate, for improved means of insulating wire.
2372. The Honorable Frederick William Cadogan, of Hertford-street, May Fair, for improvements in the means of obtaining telegraphic communications applicable to armies in the field.
2373. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in drying grain, flour, timber, fruit, vegetables, and other substances,—being a communication.

The above bear date October 14th.

2374. Richard Gill, of Culcheth, near Leigh, Lancashire, for improvements in weaving single and double fabrics.
2375. Charles Coates, of Sunnyside, near Rawtenstall, Lancashire, for improvements in and applicable to looms for weaving.
2376. Frederick Samson Thomas, of Cornhill, for improvements in the construction of railway carriages.
2377. Benjamin Price, of Fieldgate-street, Whitechapel, for certain improvements in the means of, or apparatus for, reducing the quantity of smoke from the furnaces of boilers, coppers, pans, and other like vessels.
2378. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the manufacture of iron,—being a communication.
2379. Buckley Royle and William Mac Ewan Chell, both of Manchester, for a certain method of treating silk waste arising from winding, warping, and weaving silk, and rendering it capable of being spun or otherwise employed.
2382. Thomas Woodcock, of Barnsbury-road, for improved means of cutting, carving, engraving, piercing, or embossing metallic or other surfaces.
2383. John Peary, of Salisbury-crescent, for improved means of preventing accidents on railways.
2384. Alexander Mac Dougall, of Manchester, for improvements in the process of obtaining fatty matters from products arising in the manufacture of glue and other gelatinous substances.
2386. George Laurie, of New York, for improvements in the manufacture of artificial teeth and gums,—being a communication.

2387. Augustus Applegath, of Dartford, for improvements in printing and embossing paper, with a view to prevent forgery.

The above bear date October 15th.

2388. George Frederick Chantrell, of Liverpool, for improved apparatus applicable to the manufacturing and the revivification of animal or vegetable charcoal and other useful purposes.

2390. John Macmillan Dunlop, of Manchester, for improvements in machinery or apparatus for pressing goods, applicable also to raising or removing bodies.

2391. William Scowcroft Low and John Barnes, both of Rawtenstall, for an improved shuttle to be used in looms for weaving.

2392. Capper Pass, of Bedminster, for improvements in the manufacture and refining of copper.

2393. Ellen Jones, of Palace-street, Pimlico, for improvements in steam-engine govenors. [This is the same invention as that for which letters patent were granted to her late husband on the 14th day of April last.]

2394. Samuel Cunliffe Lister, of Bradford, Yorkshire, for improvements in combing cotton and wool.

2395. John Palmer de la Fons, of Carlton-hill, St. John's Wood, for improvements in apparatus for measuring and indicating the distance travelled by a carriage.

2396. Augustus Applegath, of Dartford, for improvements in letter-press printing machinery.

2397. John James Haite and William Leach, both of New Coventry-street, for improvements in the pistons of certain valved wind instruments,—a communication.

The above bear date October 17th.

2398. George Price, of Wolverhampton, for a new or improved method of communicating between the guard and driver of a railway train.

2399. George Louis Stocks, of Limehouse Hole, for improvements in ships' jackstays for masts and gaffs for fore and aft sails.

2400. Charles Peynaud D'Azene, of Essex-street, Strand, for improvements in the method of rendering sea water fit for drinking, and all purposes where fresh water is ordinarily used.

2401. Alphonse Doste Noel, of Chancery-lane, for improvements in the manufacture of zinc white,—being a communication.

2402. John Henry Johnson, of Lincoln's-inn-fields, for improvements in raising or supporting heavy bodies, for the better preservation of life and property,—being a communication.

2403. Cornelius Nicholson, of New Broad-street, for an apparatus for avoiding collisions of trains on railways.

2405. Isaac Hartas, of Wrelton Hall, Yorkshire, for improvements in machinery for cutting turnips and other roots.

The above bear date October 18th.

2408. John Wright Child, of Halifax, and Robert Wilson, of Low Moor Iron Works, Yorkshire, for improvements in regulating motive-power engines.

2409. John Norton, of Cork, for improvements in fire-arms.

2410. William Roy, sen., of Cross Arthurlie, Renfrew, for improvements in printing textile fabrics and other surfaces.

2411. Robert Shaw, of Glasgow, for improvements in writing instruments.

2412. George Collier, of Halifax, Yorkshire, for improvements in the manufacture of carpets and other fabrics.

2413. William Little, of the Strand, for improvements in typographic printing.

2414. Charles Barraclough, of Halifax, Yorkshire, for improvements in the manufacture of carpets and other fabrics.

2415. James Barton, of Robert-street, Hampstead-road, for improvements in fittings for stables.

2416. William Watt, of Glasgow, for improvements in the preparation of flax and other fibrous substances.

2417. Thomas Thompson, of Much Park-street, Coventry, for improvements in machinery for weaving carpets, coach lace, and velvet.

2418. Alexis Dussuc, of Grove-place, Brompton, for an improved machine for digging and cultivating land.

2419. William Binns, of Leeds, for an improvement in the treatment or finishing of woollen and worsted fabrics.

The above bear date October 19th.

2421. William Russell, of Birmingham, for an improvement or improvements in the manufacture of copper tubes.

2423. John France, of North Wharf-road, Paddington, for an improved morticing machine.

2424. John Beasley Burney, of Battersea, for improvements in the prevention of smoke in steam-boilers.

2425. Gustave Gourgas, of Paris, for improvements in buffer traction or suspension springs for railway carriages, trucks, tenders, or locomotives.

2426. Julius Augustus Roth, of Philadelphia, for improvements in the bleaching and drying of fibres or fibrous materials; part of which improvements is applicable to the drying of woven and other textile manufactures.

2427. William Melville, of Burntisland, Fife, for improvements in apparatus for drawing ships out of water,—a communication.

The above bear date October 20th.

2429. John Henry Johnson, of Lincoln's-inn-fields, for improvements in apparatus for sustaining bodies in the water,—being a communication.

2430. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the treatment or manufacture of gutta-percha, and in the applications thereof,—being a communication.

2431. Christopher Cross, of Farnworth, and James Crosby, of Manchester, for improvements in machinery or apparatus for weaving.

2433. James Warburton, of Addingham, York, for improvements in preparing rape-seed oil,—being a communication.

2435. Jean François Felix Challeton, of Paris, for certain improvements in carbonizing and distilling peat, coal, wood, and other animal, vegetable, and mineral substances.

2436. Pierre Marie Fouque, Louis Réné Hébert, and Vincent Etienne Doret le Marneur, of Paris, for a fortune rudder, in bronze.

2437. Samuel Lloyd, the younger, of Wednesbury, for improvements in the construction of turntables.

2438. James Greenbank and Samuel Pilkington, of Whitnell, Lancashire, for improvements in machinery for spinning cotton and other fibrous substances.

2439. Henry Cook, of Devonshire-terrace, and Augustus Cook, of Upper Berkeley-street, for improvements in the means of communication between guards, engine-drivers, or passengers in or on railway trains.

The above bear date October 21st.

2441. Harry Bentley, of Salford, for improvements in steam-boilers, and in the method of setting or fixing the same.

2442. John Baily, of Mount-street, Grosvenor-square, for an invention for the cure of the roup and other diseases in fowls and poultry.

2443. Jean François Mermet, of Red Lion-street, Holborn, for an elastic spring contained in a cylindric tube or tubular case, the lid of which moves down and up according to the pression.

2444. Thomas Connell, of Cork, for an improved safety apparatus and method or means of signalling to be used on railways in cases of danger or emergency.

2445. Thomas Walker, of Pimlico, for an improved railway break.

2446. Hume Greenfield, of Old Cavendish-street, for improvements in obtaining power by carbonic acid gas,—being a communication.

2447. John Henry Johnson, of Lincoln's Inn-fields, for improvements in mills for grinding,—being a communication.

The above bear date October 22nd.

2448. Henry Kraut, of Zurich, for improvements in apparatus for regulating the temperature of stoves and furnaces, and of water, air, or other fluids, contained in vessels or chambers; the strength of spirituous liquors and of chemical mixtures; and the hygrometric state of the air in buildings, rooms, &c.

2449. Thomas Stainton, of South Shields, for improvements in steering apparatus.

2450. James Denoon Young, of Westminster, for improvements in casting.

2451. Charles Brewster, of Dunmow, for improvements in printing machinery,—being a communication.

2453. Alexander Hett, of Stoke Newington, for certain improved means or arrangements for the prevention of smoke and the economizing of fuel in furnaces.

The above bear date October 24th.

2455. Thomas Summerfield, of Birmingham, for improvements in the construction and manufacture of windows.

2457. Jean Baptiste Verdun, of Paris, for improvements in the construction of globes.

2458. John Fordred, of Dover, and Thomas Boyle, of Forest Gate, for improvements in day-light reflectors, and in apparatus to be used in connection therewith.

2459. John Drumgoole Brady, of Cambridge-terrace, Hyde-park, for an appendage to knapsacks.

2460. Alfred Curtis, of Sarratt Mills, Herts, and Bryan Donkin the younger, of Bermondsey, for improvements in machinery for cutting rags, rope, fibrous, and other substances.

2461. Joseph Beasley, jun., of Smethwick, for improvements in the construction and arrangement of puddling furnaces; which improvements are also applicable to other furnaces used in the generation of steam.

2463. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved construction of printing-press,—being a communication.

2464. David Bogue, of Fleet-street, for an improved mode of producing printing surfaces,—being a communication.

2465. William Bottomley, of North Bierley, for improved machinery for hand and power-loom weaving; and especially applicable to weaving figured fancy and checked goods, with any number of picks, by Jacquard engines.

2466. Charles Goodyear, of Avenue-road, for improvements in the manufacture of boots and shoes.

2467. Weston Grimshaw, of Mossley, Ireland, for improvements in steam-boilers.

The above bear date October 25th.

2469. Edward Austin, of Pembroke Cottages, Caledonian-road for improvements in surveying and raising sunken vessels, and in apparatus used therein, and in lifting vessels over bars and other obstructions.

2470. George Gower Woodward, of Lesswels, near Kidderminster, for improvements in the manufacture of carpets.

2471. Richard Heyworth, of Cross-hall, near Chorley, and Thomas Battersby, of Cross-hall aforesaid, for certain improvements in looms for weaving.

2472. George Holworthy Palmer, of Sheffield, for improvements in the construction of air furnaces for the fusion of steel and other metals, and for economizing fuel.

2473. Edward Joseph Hughes, of Manchester, for improvements in machinery or apparatus for sewing or stitching.

2474. William Penrose, of the Landore Silver Works, near Swansea, for improvements in the reduction of silver ores by mixture with other materials.

2475. Downes Edwards, of Ravenscliffe, Isle of Man, for improvements in signal apparatus for railways.

2476. Patrick Benignus O'Neill, of Paris, for improvements in screw-wrenches,—being a communication.

2477. Freiderich Ludewig Hahn Danchell, of Elm Grove Villas, Acton-green, and William Startin, of Heathfield-terrace, Turnham-green, for improvements in obtaining and applying motive power.

2478. Uriah Lane, of Brighton, for improvements in measuring and indicating time.

2479. Romain Joly, of Gaillon, France, for improvements in dyeing.

2480. Thomas Dunn, of Windsor Bridge Iron Works, Pendleton, and William Gough, of Old Compton-street, Soho, for improvements in the manufacture of veneers, and in machinery and apparatus connected therewith.

2481. James Thomas George Vizetelly, of Peterborough-court, for improvements in producing plates for printing purposes, by which the manipulatory process of engraving is superseded,—being partly a communication.

The above bear date October 26th.

2482. Amédée François Rémond, of Birmingham, for improvements in the manufacture of certain kinds of metallic vessels.

2483. Thomas Seal Blackwell, of Cranbrook, for improvements in apparatus for signalizing and stopping railway trains.

2484. Richard Richards, of Paddington, for improvements in apparatus for indicating water in the holds of vessels.

2485. Thomas Dawson, of King's-Arms-yard, for an improved case or cover for umbrellas, which can also be worn as a garment.

2487. William Vaughan, of Stockport, John Scattergood, of Heaton Norris, and Charles Grimshaw, of Brinnington, for certain improvements in healds or harness for weaving, and in the method of, and machinery or apparatus for, fabricating the same.

2488. Robert Bishop, of Edinburgh, for improvements in steam and water-valves.

2489. Henry Dolby, of Regent-street, for improvements in embossing presses.

2491. Jean Martin Adolphe Bayet Lemonnier, of Liège, for a new system of weaving by hand.

2492. Edward Loysel, of Rue de Gretry, Paris, for an improved coffee-pot.

2493. Joseph Gurney, of St. James's-street, for an improved mode of treating waterproof fabrics.

2494. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of colored and ornamented fabrics,—being a communication.

The above bear date October 27th.

2495. Malcolm Maclaren, of Johnstone, Renfrew, for improvements in fire-places, grates, or furnaces.

2496. Aristide Michel Servan, of Philpot-lane, for improvements in treating phormium tenax, flax, and other vegetable fibrous matters.

2497. John Johnson, of Over Darwen, for improvements in looms for weaving terry and other similar fabrics.

2498. John Walker Wilkins, of Ludgate-hill, for improvements in obtaining power by electro-magnetism.

The above bear date October 28th.

2500. James Nasmyth, of Patricroft, for improvements in the pistons and piston-rods of steam hammers and pile drivers, and in the parts in immediate connection therewith.

2501. Edwin Dalton Smith, of Hertford-street, May-fair, for an improvement in the construction of railway carriages, whereby, in the event of collision, the crushing of the carriages will be prevented.

2502. Peter Owen Bernard, of Rood-lane, for an improved case or hamper for carrying wine, spirits, and other liquids in bottle.

2503. Richard Archibald Brooman, of Fleet-street, for improvements in machinery for dressing flax, hemp, and other like fibrous substances,—being a communication.

2504. George Joseph Gladstone, of Brunswick-terrace, Blackwall, for improvements in apparatus for ascertaining and indicating the depth of water in the hold of a ship or vessel.

2505. Andrew Maclure, of Walbrook, for improvements in lithographic printing presses.

2506. William Betts, of Wharf-road, City-road, for certain improvements in machinery for manufacturing metallic capsules.

The above bear date October 29th.

2507. John Turner Wright, Edwin Payton Wright, and William Asbury, all of Birmingham, for an improvement or improvements in mill banding.

2508. Joseph Haley, of Manchester, for improvements in machinery or apparatus for cutting, boring, and shaping metals and other substances.

2509. Edward Gregson Banner, of Cranham-hall, Essex, for improvements in obtaining and applying motive power.

2510. Christian Göethel and Charles Moritz Zimmerman, both of Philadelphia, for improvements in stereoscopes.

2511. Felix Paulin Rovère, of Wellington-street, Strand, for improvements in joints for tubular drains.

2512. Perceval Moses Parsons, of Duke-street, Adelphi, for certain improvements in the switches and crossings of railways.

2513. John Gray, of Dublin, for a self-acting flushing apparatus, applicable to sanitary purposes.

2514. George Hamilton, of Paisley, for improvements in spreading or distributing starch, gum, and other semi-fluid matters.

2515. Anthony Park Conbrough, of Blanefield, Stirling, N. B., for improvements in printing textile fabrics and other surfaces.

2516. John Brown, of Darlington, for improvements in the construction of waggons.

2517. Damiano Assanti, of Upper Berkeley-street, for a new or improved cooling and freezing mixture.

2518. Richard Restell, of Croydon, for improvements in warming conservatories, green-houses, and other buildings.

2519. Celestin Pechoin and Eugène Pechoin Barades, both of La Chapelle St. Denis, France, for improvements in utilizing the saponaceous matters contained in the waste waters of woollen and other manufactories.

The above bear date October 31st.

2521. John Crowley, of Sheffield, for improvements in the construction of ovens and furnaces.

2522. Samuel Lomas, of Manchester, for improvements in machinery for spinning and doubling silk.

2523. James Hansor, of Wandsworth-road, for improvements in the manufacture of illuminating gas.

2524. Mark Newton, of Tottenham, for certain improvements in the construction of carriages, and in the means of preventing the overturning of the same when horses take fright,—being a communication.

2525. Arthur Elliott, of West Houghton, for improvements in looms for weaving.

2526. John Whitehead and Thomas Whitehead, both of Leeds, for certain improvements in cutting-tools, and in the working of iron, brass, and other metals, and wood and other materials.

2527. Henry Tylor, of Queen-street, for an improved chair bedstead.

2528. James Chesterman, of Sheffield, for improvements in hardening and tempering steel; and in grinding, glazing, buffing, and brushing steel and other metallic articles.

2529. William Russell Palmer, of New York, for improvements in the construction of spike threshing machines; whereby all liability to, and danger of, accident in their use, is removed and prevented.

2530. Joseph Bauer, of Prague, for cultivating and digging the soil by means of a steam-digging and harrowing-machine.

2531. James Heywood, of Ratcliffe Bridge, for certain improvements in machinery or apparatus for printing yarns.
2533. Robert Archbutt, of King's-road, Chelsea, for improvements in wood-cutting machinery.

The above bear date November 1st.

2534. William Taylor, of Newport Pagnel, for stopping of bottles containing aerated liquids.
2535. Frederick Albert Gatty, of Accrington, for an improved bath for heating and distilling.
2536. Edwin Dalton Smith, of Hertford-street, May-fair, for a new buffer-break for railway carriages.
2537. William Armand Gilbee, of South-street, for an improved apparatus for levelling,—being a communication.
2538. Edward Ward, of Potton, Bedfordshire, for an improvement in carriage axles,—being a communication.
2539. William Maltby, of Camberwell, for an improved system or arrangement for preventing collisions or accidents on railways.
2540. Brand Willis and John Musto, both of the East London Iron Works, Mile End, for improvements in rotatory pumps.
2541. Frederick Lipscombe, of the Strand, for improvements in obtaining steam power, and in regulating the same.
2543. Henry Brierley, of Chorley, for improvements in machinery or apparatus for spinning and doubling cotton and other fibrous substances.
2544. James Howard, of Bedford, for improvements in horse-rakes and harrows.
2545. Richard Edward Hodges, of Southampton-row, Russell-square, for an improvement in fastening the ends of springs made of India-rubber.
2546. Charles Iles, of Peel Works, Birmingham, for improvements in metal bedsteads.

The above bear date November 2nd.

2547. Peter Mc Gregor, of Manchester, for improvements in machinery for spinning and doubling.
2548. William Wood, of Chancery-lane, for abstracting and condensing smoke arising from steam-engines and other furnaces, and obtaining a supply of air for supporting the combustion of the fuel in such furnaces,—thereby superseding the necessity of chimney shafts and funnels.
2549. John Moffat, of Birmingham, for an improvement or im-improvements in candlesticks,—being partly a communication.
2550. Charles Reeves, jun., of Birmingham, for an improvement or improvements in the manufacture of swords, bayonets, and sword-bayonets.
2551. Thomas Irving, of Dalton, Kirkheaton, for improvements in preparing wool for spinning.

2552. Bryan Edward Duppa, of Malmaynes Hall, Kent, for improvements in coloring photographic pictures.
2553. William Patterson, of Edinburgh, for improvements in chairs.
2555. George Duncan and John Boyd, both of Liverpool, and John Barker, of Knotty Ash, near Liverpool, for improvements in casks, and in machinery or apparatus for the manufacture of casks.
2556. Ebenezer Goddard, of Ipswich, for improvements in gas-burners.
2557. Joseph Henry Tuck, of Pall-mall, for improved machinery for obtaining and applying motive power, and for raising and forcing fluids.

The above bear date November 3rd.

2559. George Nasmyth, of Brabant-court, Philpot-lane, for improvements in the construction of steam-boiler and other furnaces.
2560. William Hindman, of Manchester, for improvements in the construction of steam-boilers and in the mode or method of fixing the same.
2561. William Gilbert Ginty, of Manchester, for improvements in the mode of manufacturing the combustible gases resulting from the decomposition of water or steam, and in the construction of apparatus connected therewith.
2562. William Crosland, of Hulme, for improvements in apparatus for governing the speed of steam and other motive power engines.
2563. William Racster, of the Royal Military Academy, Woolwich, for improvements in the construction and arrangement of the buffing apparatus of railway carriages, and in the mode of applying the buffer and draw springs to such carriages.
2564. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for crushing ores, and separating therefrom gold, silver, or other metals contained therein, —being a communication.
2565. John Hartley Higginbottom, of Ashby de la Zouch, for improvements in water-closets and in the apparatus connected therewith.
2566. Henry Pratt, of Worcester, for improvements in kneading dough, and which said improvements are also applicable to the kneading or beating of clay, loam, or other plastic materials.
2567. William Foster, of Bradford, Yorkshire, for improvements in looms for weaving.
2568. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the manufacture of malleable iron; which improvements are also applicable to the manufacture of other malleable metals,—being a communication.

The above bear date November 4th.

2569. John Smith, of the Albion Works, Bradford, Yorkshire, for improvements in mill-stones for grinding corn, seeds, or minerals.

2571. Samuel Harrison, of Crewe, Chester, for improvements in and applicable to steam-engines.

2572. John Hyde, of Sheffield, for improvements in furniture castors.

2573. Charles Carr, of Seghill, Northumberland, and William Kyle Horsley, of the same place, for improvements in steam machinery and pumps for lifting water from mines and other places.

2574. Robert William Jearrad, of Upper Eccleston-place, for improvements in steam-boiler and other furnaces.

2575. John Rubery, of Birmingham, for improvements in the manufacture of open caps for sticks of umbrellas and parasols.

2577. William Beckett Johnson, of Manchester, for improvements in steam-engines and in apparatus for indicating the pressure of steam.

2578. Edwin Kesterton, of Long Acre, for improvements in springs for carriages.

The above bear date November 5th.

2579. Henry Pershouse and Timothy Morris, both of Birmingham, for an improvement or improvements in the deposition of metals and metallic alloys.

2580. John Todd, of Fish-street-hill, for improvements in the spindles and bearings of lathes and drilling machines, and in other spindles and bearings.

2581. Marino Louis Joseph Christophe Vincent Falconi, of Paris, for a certain composition for the preservation of the dead.

2583. Jonathan Grindrod, of Liverpool, and Alexander Hunter, of the same place, for improvements in steam-engines.

2584. Henry Wiglesworth, of Newbury, for improvements in connecting together or coupling railway carriages.

2585. Robert Roughton, of Woolwich, for an improvement in steam-boilers, which is applicable to other vessels for containing compressed air, vapour, or gas.

2586. Thomas Walker, of Birmingham, for improvements in signal apparatus for the prevention of accidents on railways.

2587. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for certain improved means for preventing the fraudulent abstraction of property,—being a communication.

The above bear date November 7th.

2588. John Onions and Samuel Bromhead, hoth of Peckham, for certain improvements in machinery used iu the manufacture of paper and papier-maché.

2589. John Gardiner, of Great Marlow, and William Watkin Wynne, of the same place, for an improved construction of gas-stove.

2590. Edmund Hugh Graham, of Maine, U.S., for new and useful improvements in fire-arms.

2591. Humphrey Chamberlain, of Kempsey, near Worcester, for improvements in the manufacture of bricks and tubes, or tiles.

2592. George Frederick Parratt, of Pimlico, for improvements in life rafts.

2593. Edward Lambert Hayward, of Blackfriars-road, for improvements in the roses of door and other locks.

2594. John Henry Johnson, of Lincoln's-inn-fields, for improvements in machinery for combing and preparing wool and other fibrous materials,—being a communication.

The above bear date November 8th.

2596. Benjamin Dangerfield and Benjamin Dangerfield, jun., both of West Bromwich, for improvements in the construction of steam-boilers.

2597. Thomas Dunn, of the Windsor Bridge Iron Works, Pendleton, James Bowman, of Plaistow, and Joseph Dunn, of Pendleton, for improvements in machinery for raising, moving, and lowering heavy bodies.

2598. Jerome André Drieu, of Patricroft, for improvements in machinery for cutting velveteens and certain other fabrics to produce a piled surface.

2599. John Brown, of Darlington, Durham, for improvements in coke ovens.

2600. William Dicks, of Floore, Northamptonshire, for improvements in wheels for carriages.

The above bear date November 9th.

List of Patents

Granted for SCOTLAND, from the 22nd October to the 22nd November, 1853.

To James Hart, of the Atlas Iron Works, Surrey, for improvements in the manufacture of bricks, tiles, and other articles made from plastic materials; and in the means of making parts of the machinery used therein.—Sealed 24th October.

William Palmer, of Woodford, in the county of Essex, for improvements in the manufacture of candles and candle-wicks, and in the machinery applicable to such matters.—Sealed 2nd November.

Charles Frederick Bielefeld, of Wellington-street, North Strand, for improvements in the manufacture of sheets of papier-maché or substances in the nature thereof.—Sealed 9th November.

New Patents.

Sealed under Patent Law Amendment Act, 1853.

658. John Talbot Ashenhurst, of Upper John-street, for improvements in piano-fortes.—March 17.
727. Alexander Price, of Trafalgar-square, for improvements in carriages,—being a communication.—March 26.
756. George Shaw, of Sheffield, for improvements in the manufacture of knives and forks.—March 29.
903. William Laycock, of Birkenhead, for improvements in the manufacture of metallic and other casks and vessels.—April 14.
1002. Auguste and Jean Le Roy and Eugène Pavy, all of Paris, for improvements in the production of lace and other fabrics. —April 26.
1012. Richard Howson, of Manchester, for certain improvements in weavers' harness,—being a communication.—April 27.
1014. Joseph Walter Gale, of Woburn-place, Russell-square, for improvements in the permanent way of railways.—April 27.
1020. James Andrew Bruce, of Coleraine, for certain improvements in the construction of hay-racks, and other apparatus or apparatuses to contain fodder for horses and other cattle, and also in the method or methods of fastening horses or other cattle, to prevent their overcasting.—April 27.
1021. Thomas Culpin, of Greenwich, for improvements in steam-boilers, and in the appendages thereto.—April 27.
1028. Joseph Hetherington, of Manchester, for certain improvements in reels for reeling or winding yarns.—April 28.
1035. William Armand Gilbee, of South-street, for improvements in apparatus for heating,—being a communication.—April 28.
1041. Thomas Collins Banfield, of Queen-square, Westminster, for machinery for cutting or chopping roots, plants, or other similar substances,—being a communication.—April 29.
1042. Thomas Collins Banfield, of Queen-square, Westminster, for drying and preserving vegetable or other saccharine plants, —being a communication.—April 29.
1051. Barnabas Barrett, of Ipswich, for improvements in the treatment of natural and artificial stone, and of articles composed of porous cements or plaster, for the purpose of hardening and coloring the same.—April 30.
1053. Weston Grimshaw, of Mosley, county Antrim, Ireland, for certain improvements in slubbing and roving frames for preparing for spinning cotton, flax, and other fibrous substances. April 30.
1057. Henry Constantine Jennings, of Great Tower-street, for improvements in the manufacture of soap.—May 2.

1060. James Reeves, of Bridgewater-gardens, Barbican, for improved machinery for forging, stamping, crushing, or otherwise treating metals, ores, and other similar materials.—May 2.

1062. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in the extraction and manufacture of sugar, and of saccharine matters,—being a communication.—May 2.

1065. Auguste Edouard Laradoux Bellford, of Castle-street, for improvements in sawing machines for slitting or re-sawing plank and other timber, by means of circular saws,—being a communication.—May 2.

1071. Thomas Claridge, of Bilston, for new or improved machinery for cutting or shearing metals.—May 3.

1074. George Frederick Goble, of Fish-street-hill, for improvements in locks.—May 3.

1079. Thomas Chambers and John Chambers, of the Thorncliffe Iron Works, near Sheffield, for certain improvements in kitchen sinks.—May 3.

1085. Edward Walmsley, of Heaton Norris, for improved modes of preventing accidents arising from an insufficient supply of water in steam-boilers.—May 4.

1088. Jean Brando Giannetti, of Paris, for applying the ascensional force of balloons to various useful purposes.—May 4.

1106. Matthias Edward Boura, of Crayford, for improvements in saddlery and harness.—May 5.

1110. Thomas Fearnley, of Bradford, Yorkshire, for improvements in steam-boilers.—May 5.

1116. John Ryan Danks and Bernard Peard Walker, both of Wolverhampton, for improvements in machinery or apparatus for the manufacture of nails.—May 6.

1118. John Thomas Stroud, of Birmingham, for improvements in the valves of pressure lamps, and in lamp-burners.—May 6.

1120. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in the manufacture of hat-plush,—being a communication.—May 6.

1123. Mariano Riera, of Madrid, for certain improvements in fire-arms.—May 6.

1124. Francesco Capeccioni, of Castle-street, for certain improvements in the manufacture of candles.—May 6.

1126. Christopher Richard Norris Palmer, of Amwell, for a new and improved mode of communicating or signalling between the guards and engine-drivers on a railway train; also applicable to other purposes.—May 7.

1129. Hesketh Hughes and William Thomas Denham, both of Cottage-place, City-road, for improvements in machinery for weaving.—May 7.

1133. George England, of Hatcham Iron Works, New Cross, for improvements in screw-jacks.—May 7.

1134. Edward Blackett Beaumont, of Wood Hall, Barnsley, Yorkshire, for certain improvements in the mode of constructing

dwelling-houses or other buildings, and in peculiar shaped bricks and tiles to be used for the purpose.—May 9.

1136. David Law, of Glasgow, and John Inglis, of the same place, for improvements in moulding or shaping metals.—May 9.

1143. John Clapham, Thomas Clapham, and William Clapham, of Wellington Foundry, Keighley, for improvements in moulding and casting iron pipes.—May 10.

1144. Thomas Murray, of Marygold, Berwick, for certain improvements in breaks or drags for wheeled carriages, and in adapting the carriages for the application and use of such breaks.—May 10.

1145. Gregory Kane, of Dublin, for the construction of portable houses, or portions thereof, out of parts, which may be used for other purposes,—May 10.

1152. Alexander Chaplin, of Glasgow, for improvements in apparatus for the transmission of aeriform bodies.—May 10.

1153. George Stevenson Buchanan, of Glasgow, for improvements in the treatment or finishing of textile fabrics.—May 10.

1160. Richard Edmondson, of Blackburn, for certain improvements in the manufacture of covered corded textile fabrics, and in machinery to be used for that purpose,—being applicable either to hand or power.—May 11.

1167. Edmund Whitaker, of Rochdale, and James Walmsley, the younger, of Smithy Bridge, near Rochdale, for improvements in the manufacture of pipes, tiles, bricks, and slabs, from clay. —May 11.

1169. George Bell, of Powell-street, Goswell-street, for improvements in obtaining liquid cement and pigments or paints.—May 11.

1172. George Frederic Goble, of Fish-street-hill, for improvements in propelling vessels and carriages; part of the machinery therein employed being also applicable to other like purposes.—May 12.

1177. Julian Bernard, of Guildford-street, Russell-square, and Edward Taylor Bellhouse, of the Eagle Foundry, Manchester, for improvements in pressing and in extracting fluids.—May 12.

1178. Charles Pooley, of Manchester, for an improved mode of feeding machines for opening, cleaning, blowing, and scutching cotton and other fibrous substances.—May 13.

1186. Richard Archibald Brooman, of London, for improvements in the manufacture of hats,—being a communication.—May 13.

1188. John Knowles, of Manchester, and Edward Taylor Bellhouse, of the same place, for certain improvements in the manufacture of articles of marble.—May 13.

1191. George Coppock, of Heaton Norris, for certain improvements in looms for weaving.—May 14.

1194. Thomas Stephen Holt, of Manchester, for improvements in steam-engines, which improvements are also applicable to the machinery or apparatus connected to steam-boilers.—May 14.

1197. William John Warner, of King-street, Soho, for improvements in dry gas-meters.—May 14.

1200. Stephen Garrett, of Taunton-place, Bermondsey, for improvements in the preparing and tanning of skins, hides, or pelts of animals.—May 14.

1201. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in steam-engines,—being a communication.—May 14.

1202. Peter Armand Le Comte de Fontainemoreau, of South-street, for certain improvements in steam-boilers,—being a communication.—May 14.

1203. John Drumgoole Brady, of Cambridge-terrace, for imments in knapsacks.—May 14.

1206. Jean Jaques Joseph Jamin, of Gerrard-street, and Alexander Symons, of the Strand, for certain improvements in the manufacture of boots and shoes.—May 16.

1208. Thomas Richardson, of Newcastle-upon-Tyne, for improvements in the manufacture of certain compounds containing phosphoric acid.—May 16.

1209. Robert Boyd, of Paisley, for improvements in weaving.—May 16.

1214. Charles James Pownall, of Addison-road, for improvements in the preparation and treatment of flax and other similar vegetable fibres.—May 17.

1215. John Lee Stevens, of King William-street, City, for improvements in grates and stoves.—May 17.

1217. James Thomas George Vizetelly, of Peterborough-court, and Henry Richard Vizetelly, of Gough-square, for improvements in printing machines, — being a communication.—May 17.

1220. Charles Cooper, of Southampton-buildings, for improvements in machinery for combing and preparing wool and other fibrous substances,—being a communication.—May 18.

1222. John Haskett, of Wigmore-street, for improvements in anchors, to be called the "Ferdinand Martin safety-anchor,"—being a communication.—May 18.

1224. Wharton Rye, of Collyhurst, near Manchester, for certain improvements in kitchen ranges or fire-grates.—May 18.

1227. John Ryan, of Liverpool-street, London, for an apparatus for purifying liquids in a ready and economical manner.—May 18.

1228. John Barsham, of Kingston-upon-Thames, for improvements in drying bricks, peat, and other articles.—May 18.

1229. John Barsham, of Kingston-upon-Thames, for improvements in charring peat and other vegetable substances, and in burning lime.—May 18.

1230. Edward Thornhill Simpson, of Wakefield, for improvements in the manufacture of manure.—May 18.

1231. George Sant, of Norton Lodge, Mumbles, Swansea, for improvements in clocks or time-keepers.—May 18.

1233. John Oakey, of Blackfriars-road, for improvements in reducing emery, glass, and other like substances.—May 18.

1234. Benjamin Newton, of Brighton, for improvements in the manufacture of mats.—May 18.

1235. Job Allen, of Bower-street, for improvements in communicating intelligence.—May 18.

1237. Samuel Wright, of Church-street, Shoreditch, for making a gas, steam, air, or liquid safty-tap.—May 19.

1239. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery or apparatus applicable for pumping water and supplying steam-boilers with water, and maintaining the water therein at a proper level,—being a communication.—May 19.

1243. John Thornborrow Manifold, Charles Spencer Lowndes, and John Jordan, all of Liverpool, for improvements in the method of extracting the juice from the sugar-cane.—May 19.

1244. William Fulton, of Paisley, for improvements in the treatment and scouring or cleansing of textile fabrics.—May 19.

1246. St. Thomas Baker, of King's-road, Chelsea, for improvements in revolving shutters.—May 20.

1247. Charles Cowper, of Kensington, for improvements in steam-boilers.—May 20.

1251. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in rotary engines to be driven by steam or any vapour, fluid, or gas, and in boilers or generators to be used in generating steam or gas for driving the aforesaid or other engines, or for other purposes,—being a communication.—May 20.

1252. Thomas Isaac Dimsdale, of Kingstown, near Dublin, for improvements in purifying coal gas and in disinfecting sewage or other fetid matters, and in absorbing noxious gaseous exhalations.—May 21.

1256. John Blair, of Ducie Bridge Mill, Manchester, for the application of steam-power to the working of railway breaks.—May 21.

1259. Louis Gervais Dieudonné Buffet Delmas Ducayla, of Bordeaux, for an improved manufacture of artificial fuel,—being a communication.—May 21.

1260. Henri Joseph Scoutetten, of Metz, France, for an improved plastic compound, applicable to various ornamental and useful purposes.—May 21.

1262. Auguste Edouard Loradoux Bellford, of Castle-street, for improvements in navigable vessels to be employed in all waters, and to be propelled or impelled by sails, steam-power, or other means,—being a communication.—May 21.

1263. Samuel Alfred Carpenter, of Birmingham, for a new or improved elastic webbing or fabric.—May 21.

1267. Auguste Edouard Loradoux Bellford, of Castle-street, for an improved method of treating flax and hemp, whereby they are brought to such a state that they may be carded, spun, and woven by machinery, such as is now employed in the manufacture of cotton and wool into yarn and cloth,—being a communication.—May 23.

1269. John Harcourt Browne, of Arthur's Seat, Aberdeen, for improvements in apparatus for bottling or supplying vessels with fluids.—May 23.

1271. Henry Turner, of Wilson-street, Limehouse, for a new mode of applying hydraulic power to windlasses, for weighing anchors and lifting heavy weights.—May 23.

1276. William Babb, of Gray's-inn-road, for improvements in the manufacture of hats, caps, and bonnets.—May 23.

1288. Alexander Porecky, of Bishopsgate-street Within, for improvements in the manufacture of umbrellas and parasols.—May 26.

1289. Thomas Singleton, of Over Darwen, for improvements in looms.—May 26.

1300. William Weatherley and William Jordan, of Chartham, for improvements in the stuffing-boxes of piston-rods.—May 26.

1309. William Wolfe Bonney, of West Brompton, for improvements in machinery for raising a pile or flue by abrasion on linen, cotton, silk, and other fabrics.—May 27.

1311. Illingworth Butterfield, of Bradford, York, for improvements in and applicable to looms for weaving.—May 28.

1313. Ebenezer Nash, of Duke-street, Lambeth, and Joseph Nash, of Thames-parade, Pimlico, for improvements in the manufacture of wicks.—May 28.

1314. George Harriott, of Islingham, Fridsbury, Kent, for improvements in agricultural .implements employed in crushing and rolling land, and in frames for the same.—May 28.

1316. Caleb Hill, of Cheddar, for improvements in the construction of stays.—May 28.

1324. John Henry Johnson, of Lincoln's-inn-fields, for improvements in removing the gummy or glutinous matter from textile and other materials,—being a communication.—May 28.

1327. John Macdonald, of Henry-street, Upper Kennington-lane, for improvements in and applicable to lamps; also applicable to apparatus for lighthouse signal purposes; part of the invention applicable for other useful purposes.—May 30.

1329. Julian Bernard, of Guildford-street, Russell-square, for improvements in obtaining differential mechanical movements.—May 30.

1330. William Green, of Islington, for improvements in treating or preparing yarns or threads.—May 30.

1332. Richard Archibald Brooman, of Fleet-street, for improvements in fire-arms,—being a communication.—May 30.

1336. George Goodlet, of Leith, for improvements in engines to be worked by steam, air, or air and water combined.—May 31.

1345. Maxwell Scott, of Birkenhead, for improvements in propelling.—June 1.

1348. William Knowles, of Bolton-le-Moors, for improvements in machinery for warping and beaming yarns or threads.—June 2.

1370. William Edward Maude, of Liverpool, for improvements in carriages,—being a communication.—June 3.

1371. William Edward Maude, of Liverpool, for improved apparatus for steering ships,—being a communication.—June 3.

1374. Joseph Gyde, of Tooley-street, for improvements in mills and apparatus for grinding and dressing corn and various substances.—June 4.

1375. John Chisholm, of Holloway, for improvements in the production or manufacture of artificial manures.—June 4.

1377. Henry John Betjemann, of New Oxford-street, for improvements in chairs.—June 4.

1382. Thomas Rush Nash, of Leigh-street, for improvements in filters.—June 4.

1394. George Bazett Colvin Leverson, of St. Helen's-place, for a new application, construction, and arrangement of springs for carriages and such like purposes,—being a communication.—June 7.

1420. Samuel Frankham, of Greenland-place, Judd-street, for an improved construction of coupling joint, applicable to pipes, vessels of capacity, and other like uses.—June 10.

1427. William Henry Smith, of Bloomsbury, for improvements in the permanent way of railways.—June 13.

1473. Solomon Solomon, of Aldgate, and Samuel Mills, of St. George's in the East, for improvements in axle-boxes for locomotive engines, railway and other carriages, applicable to the bearings of machinery.—June 16.

1481. John Piddington, of Brussels, for improvements in obtaining infusions and decoctions, and in vessels or apparatus employed therein,—being a communication.—June 17.

1536. Noble Carr Richardson, of South Shields, for an improved capstan.—June 24.

1541. John Henry Johnson, of Lincoln's-inn-fields, for improvements in the production or manufacture of flour,—being a communication.—June 24.

1572. James Tatlow, of Wirksworth, Derbyshire, and Henry Hodgkinson, of the same place, for improvements in smallware looms.—June 29.

1576. Williams Rice, of Boston, Lincolnshire, for improvements in harness for horses and other animals, and in the manufacture of springs for the same.—June 30.

1593. Richard Archibald Brooman, of Fleet-street, for improvements in impregnating, saturating, or coating threads, yarns,

and fabrics with metal, which process the inventor terms metallic dyeing,—being a communication.—July 2.

1601. John Fall, of Chorlton-upon-Medlock, for improvements in the treatment of certain oils.—July 5.

1615. Robert Anderson Rüst, of Regent-street, for an improvement in piano-fortes.—July 6.

1617. William Edward Newton, of the Office for Patents, 66, Chancery-lane, for improvements in locks and latches,—being a communication.—July 6.

1618. Henry Bate, of New Hampstead-road, Kentish Town, for a new fire-escape, which he denominates the 'Ignevador.'—July 7.

1666. Frederic Ransome, of Ipswich, for improvements in the manufacture of artificial stone and similar wares.—July 13.

1673. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of anvils,—being a communication.—July 14.

1681. George Gowland, of Liverpool, for improvements in certain nautical and surveying instruments.—July 15.

1688. Charles Goodyear, of St. John's Wood, for improvements in spreading or applying India-rubber or compositions of India-rubber on fabrics.—July 15.

1690. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of brushes and substitutes for bristles.—July 15.

1693. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of pens, pencils, and instruments used when writing, marking, and drawing.—July 15.

1694. Charles Goodyear, of St. John's Wood, for improvements in preparing India-rubber.—July 15.

1695. Charles Goodyear, of St. John's Wood, for improvements in the manufacture of beds, seats, and other hollow flexible articles, to contain air.—July 15.

1731. Thomas Gray and John Reid, both of Newcastle, for an improved mode of manufacturing files and rasps.—July 22.

1733. George Spencer, of Manor-road, Walworth, for improvements in springs for carriages.—July 22.

1742. Joseph Bennett Howell, of Sheffield, and William Jamieson, of Ashton-under-Lyne, for an improvement or improvements in the manufacture of saws.—July 25.

1761. John Giblett, of Trowbridge, for improvements in the manufacture of woollen cloth and other fabrics.—July 26.

1772. Benjamin Collins Brodie, jun., of Albert-road, Regent's-park, for improvements in treating or preparing black lead.—July 28.

1774. Griffith Jarrett, of London, for improvements in machinery or apparatus for stamping or printing colored surfaces.—July 29.

1780. George Katz Douglas, of Chester, for certain improvements in the permanent way of railways.—July 30.

1789. John Carvalho de Medeiros, of Passy, near Paris, for improvements in the means or processes for preserving metals from corrosion,—being a communication.—August 1.

1812. John Slack, of Manchester, for improvements in reeds for looms.—August 3.

1818. James Billings, of Greenwich, for improvements in roofing buildings.—August 3.

1827. George Fergusson Wilson, of Belmont, Vauxhall, and Alexander Isaac Austen, of Trinity-place, Wandsworth-road, for improvements in the apparatus used in the manufacture of mould candles. —August 4.

1829. William Smith and Thomas Phillips, of Snow-hill, for an improved boiler.—August 5.

1838. John Hughes, of Great George-street, for improvements in building or forming structures under water, or below the surface of the ground.—August 6.

1839. John Marten, of High-street, Marylebone, for an improved shade for gas-burners and lamps.—August 6.

1847. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in horse-shoes,—being a communication.—August 8.

1848. William Hickson, of Carlisle, for improvements in the application of heat for baking and drying purposes, and in the generation of steam.—August 8.

1849. Moses Poole, of Avenue-road, Regent's-park, for improvements in regulating the flow and pressure of gas and other fluids,—being a communication.—August 8.

1852. William Rowan, of Belfast, for improvements in looms for weaving, and apparatus connected therewith.—August 9.

1855. William Baines, of Coverdale-terrace, near Birmingham, for improvements in railways.—August 9.

1858. James Burden, of Stirling, for an improved cock or tap.—August 10.

1864. William Edward Newton, of the Office for Patents, Chancery-lane, for an improved preparation or composition, to be applied to pigments for the purpose of facilitating the drying of the same,—being a communication.—August 10.

1870. Richard Farmer Brand, of South-terrace, Willow-walk, Bermondsey, for certain improvements in fire-arms and ordnance.—August 11.

1872. Henry Moore Naylor, of Montpelier-row, Birmingham, for improvements in affixing postage and other stamps.—Aug. 11.

1873. John Dearman Dunnicliff, of Hyson-green, Nottingham, and John Woodhouse Bagley, of Radford, for improvements in the manufacture of lace fabrics.—August 11.

1875. Thomas Frederick Newell, of Cloak-lane, Queen-street, Cheapside, for improvements in machinery for numbering the pages of books and documents,—being a communication.—August 11.

1876. William Longmaid, of Beaumont-square, Mile-End, for improvements in the manufacture of manure.—August 11.

1882. Edward Lavender and Robert Lavender, both of Deptford, for an improved apparatus for preparing the materials employed in the manufacture of certain composition fire-lighters.—August 12.

1884. Richard Archibald Brooman, of Fleet-street, for improvements in the manufacture of fuel,—being a communication.—August 12.

1885. Richard Archibald Brooman, of Fleet-street, for certain new compounds which may be employed for mouldings, frames, and many purposes to which wood, papier-maché, plaster, gutta-percha, and other like substances are applicable,—being a communication.—April 12.

1886. Richard Archibald Brooman, of Fleet-street, for a method of obtaining impressions from dies and other engraved and figured surfaces, by stamping or pressure,—being a communication.—August 12.

1892. Daniel Illel Picciotti, of Crosby-square, for improvements in weaving,—being a communication,—August 12.

1897. John Perkins, of Manchester, for improvements in the manufacture of oils.—August 13.

1901. John Gwynne, of Essex-wharf, Strand, and James Egleson Anderson Gwynne, of the same place, for improvements in the preparation or manufacture of fuel.—August 13.

1907. Joseph Leon Talbot, of Paris, and John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of cast-steel.—August 15.

1908. Alexander Dalgety, of Deptford, for improvements in rotatory steam-engines.—August 15.

1909. George Edward Dering, of Lockleys, for improvements in electric telegraphs.—August 15.

1912. James Stewart, of St. Paul's-road, Camden-square, for improvements in piano-fortes.—August 15.

1920. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for improvements in the distillation and purification of rosin oil,—being a communication.—August 16.

1921. John Heritage, of Warwick, for an improvement in the manufacture of bricks, pipes, tiles, coping, and such other articles as or may be moulded in clay.—August 17.

1925. Thomas Kirkwood, of Edinburgh, for improvements applicable to ventilation and other purposes.—August 17.

1927. George Leedham Fuller, of St. Mary's-road, Peckham, for improvements in steam-engines.—August 17.

1928. Joseph Hart Mortimer, of Chester-place, Old Kent-road, for improvements in lamps.—August 17.

1929. Robert Clough, of Liverpool, for improvements in the construction of ships and other vessels.—August 18.

1935. Peter Fairbairn, of Leeds, for certain improvements in heckling machines.—August 18.

1942. Charles Watt, of Selwood-place, Old Brompton, and Hugh Burgess, of Percy-street, Bedford-square, for improvements in disintegrating and pulping vegetable substances.—August 19.

1943. George Heyes, of Bolton, for improvements in looms.—August 19.

1945. John Webster Cochrane, of Gower-street, for improvements in machinery for crushing, grinding, and pulverizing stone, quartz, or other substances.—August 20.

1947. Robert Moore Sievier, of Louviers, France, for improved machinery for the manufacture of terry or cut-pile fabrics; parts of which are applicable to the weaving of other fabrics.—August 20.

1952. John Steven, of Edinburgh, for an improved axle-box for railway carriages and waggons.—August 22.

1955. Frederick Osbourn, of Albion-street, King's Cross, for improved machinery for cutting woven and other fabrics.—Aug. 22.

1958. Moses Poole, of Avenue-road, Regent's-park, for improvements in crushing and pulverizing quartz and other substances,—being a communication.—August 23.

1959. James Webster, of Leicester, for improvements in pressure gauges.—August 23.

1960. Thomas Charles Medwin, of the Blackfriars-road, for improvements in steam-engine boilers.—August 23.

1974. Edward, Heard, of Regent-street, Lambeth, for a certain mixture of composition of chemical agents for rendering sea-water fit for washing, and for softening hard water for similar purposes.—August 24.

1976. Alfred Beck Thompson, of Richmond, for a new or improved spring-door hinge,—being a communication.—Aug. 25.

1988. Charles William Lancaster, of New Bond-street, for a method of, and machinery for, manufacturing or producing certain descriptions of gun and pistol barrels.—August 27.

1991. John Davie Morries Stirling, of the Larches, near Birmingham, for improvements in the manufacture of rails and parts of railways, and tyres of railway wheels.—August 27.

1994. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved construction of steam-hammer,—being a communication.—August 27.

1998. John Foss, of Aldgate, for improvements in printing apparatus.—August 29.

2002. Peter Armand Le Comte de Fontainemoreau, of South-street, for improvements in apparatus for heating,—being a communication.—August 29.

2008. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in rules, graduated scales, and measuring instruments.—August 30.

2009. Charles Goodyear, of Avenue-road, St. John's Wood, for improvements in the manufacture and ornamenting or coating of articles when compounds containing India-rubber are used.—August 30.

2011. James Picciotti, of Crosby-square, for improvements in burning and reburning amimal charcoal,—being a communication.—August 30.

2012. Alfred Vincent Newton, of the Office for Patents, Chancery-lane, for an improved process of dyeing; part of which process is also applicable to bleaching,—being a communication. —August 30.

2013. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for cleaning bran or other offal obtained during the manufacture of flour,—being a communication.—August 30.

2014. William Edward Newton, of the Office for Patents Chancery-lane, for improved machinery for cleaning grain and seeds, —being a communication.—August 30.

2016. Astley Paston Price, of Margate, for improvements in treating wash-waters containing soap, oils, saponified or saponifiable materials, and in obtaining products therefrom.—August 31.

2020. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for reaping and gathering corn, grain, and other agricultural produce,—being a communication.—August 31.

2021. William Edward Newton, of the Office for Patents, Chancery-lane, for improved machinery for making barrels and other casks,—being a communication.—August 31.

2023. Henry Jeremiah Iliffe and James Newman, both of Birmingham, for improvements in the manufacture of buttons.—August 31.

2026. John Macintosh, of Pall Mall, for improvements in breakwaters.—September 1.

2027. Robert Oxland, of Plymouth, for improvements in the manufacture of manure.—September 1.

2028. John Hinks, George Wells, and Frederick Dowler, all of Birmingham, for new or improved machinery, to be used in the manufacture of metallic pens and penholders.—Sept. 2.

2046. William Edward Newton, of the Office for Patents, Chancery-lane, for improvements in breech loading guns,—being a communication.—September 5.

2047. Thomas Bollmann Upfill, and William Brown, both of Birmingham, for an improvement or improvements applicable to metallic bedsteads, couches, chairs, and such other articles as are or may be used for sitting, lying, and reclining upon.—September 6.

2059. William Joseph Smith, of Stretford, for certain improvements in buttons or other such fastenings, and in applying or affixing them to wearing apparel.—September 7.

2060. Western Grimshaw, of Morsley, Ireland, and Ellis Rowland, of the same place, for improvements in the manufacture of bricks.—September 7.

2064. James Gascoigne Lynde, jun., of Great George-street, for a pressure governor, or self-acting apparatus for regulating the flow of water.—September 8.

2070. William Hall, of the Colliery, Castlecomer, for improvements in the conversion of peat into charcoal.—September 8.

2077. James Martin, of Faversham, for improvements in locks. —September 9.

2079. Isaac Lowthian Bell, of The Washington Chemical Works, Newcastle-upon-Tyne, for improvements in the manufacture of sulphuric acid.—September 9.

2081. Cyprien Marie Tessié du Motay, and Edmond Louis Duflos, of Paris, for improvements in the mode of bleaching fibrous and other substances.—September 9.

2082. Jonathan Amory, of Boston, United States of America, for improvements in furnaces.—September 9.

2083. James Childs, of Gilston-road, Brompton, for improvements in the manufacture of materials to render them suitable as substitutes for millboard and such like uses.—September 9.

2085. Ernest Alexandre Gouin, of Avenue de Clichy, Paris, for improvements in looms or weaving machines, applicable to the weaving of cotton, silk, flax, hemp, wool, or any other fibrous substances; by means of which improvements the warp-threads are unwound more regularly from the warp-roller, and the cloth or tissue taken up with more regularity, at the same time without straining the warp-thread; and by means of a peculiar motion in releasing the tension on the warp-thread, he is enabled to give an elastic or back-motion to the warp, which permits of all inelastic fibrous substances to be woven upon the power-loom; and, in case the weft-thread should break, the loom can continue in motion without the cloth-roller continuing to take up, or without detriment to the tissue.—Sept. 9

2094. Edmund Leyland, of St. Helen's, Lancashire, for improvements in apparatus for the manufacture of sulphuric acid.—September 10.

2097. Robert Tronson, of the Chamber of Commerce, Liverpool, for improvements in ventilating and preventing spontaneous combustion in ships and other vessels laden with coal, culm, or cinders.—September 10.

2098. Thomas Metcalfe, of High-street, Camden Town, for improvements in portable chairs and tables.—September 10.

2100. John Ward, of Saville-house, Leicester-square, and Edward Cawley, of Stanley-street, Chelsea, for improvements in chairs, couches, and tables.—September 10.

2101. Joseph Marks and John Howarth, of Massachusetts, for certain new and useful improvements in machinery or apparatus for operating the brakes of a train of railway carriages.—September 10.

CELESTIAL PHENOMENA FOR DECEMBER, 1853.

D.	H.	M.	
1			Clock after the ☉ 10m. 42s.
	—		☽ rises 8h. 39m. M.
	—		☽ passes mer. 0h. 33m. A.
	—		☽ sets 4h. 21m. A.
	17	11	♃ in conj. with the ☽ diff. of dec. 1. 53. N.
		38	Pallas in conj. with ☿ diff. of dec. 26. 4. N.
3	14	39	♀ in conj. with the ☽ diff. of dec. 1. 23. N
4	12	29	☿ in inf. conj. with the ☉
	20	39	☿ in Perihelion
5			Clock after the ☉ 9m. 6s.
	—		☽ rises 0h. 24m. A.
	—		☽ pass mer. 4h. 42m. A.
	—		☽ sets 9h. 9m. A.
6			Occul. r^1 Aquarii, im. 7h. 49m. em. 8h. 57m.
	—		Occul. r^2 Aquarii, im. 9h. 18m. em. 10h. 4m.
7	0	10	☽ in □ or first quarter.
	22	39	Pallas in conj. with ☉
9			Occul. 33 Ceti, im. 9h. 5m. em. 9h. 33m.
10	4	48	Vesta in conj. with ♂ diff. of dec. 2. 8. N.
	—		Clock after the ☉ 6m. 54s.
	—		☽ rises 1h. 51m. A.
	—		☽ pass mer. 8h. 30m. A.
	—		☽ sets 2. 12. M.
11	6	1	♅ in conj. with the ☽ diff. of dec. 2. 32. N.
12	19	7	♄ in conj. with the ☽ diff. of dec. 0. 59. N.
13			Occul. *w* Tauri, im. 4h. 34m. em. 5h. 10m.
14	8	33	☿ stationary
	18	0	☽ in Apogee
15			Mercury, R. A., 16h. 13m. dec. 18. 18. S.
	—		Venus, R. A., 20h. 55m. dec. 19. 35. S.
	—		Mars, R. A., 10h. 55m. dec. 9. 41. N.
	—		Vesta, R. A. 10h. 53m. dec. 12. 15. N.
	—		Juno, R. A., 11h. 37m. dec. 2. 13. S.
15			Pallas, R.A., 17h.21m.dec.3.28.N.
	—		Ceres, R.A., 17h.42m.dec.24.13.S.
	—		Jupiter, R. A., 18h. 13m. dec. 23. 20. S.
	—		Saturn, R. A., 3h. 38m. dec. 17. 12. N.
	—		Uranus, R. A., 2h. 27m. dec. 14. 7. N.
	—		Mercury pass mer. 22h. 34m.
	—		Venus pass mer. 3h. 19m.
	—		Mars pass mer. 17h. 17m.
	—		Jupiter pass mer. 0h. 37m.
	—		Saturn pass mer. 9h. 52m.
	—		Uranus pass mer. 8h. 49m.
	—		Clock after the ☉ 4m. 32s.
	—		☽ rises 3h. 42m. A.
	—		☽ passes mer. Morn
	—		☽ sets 7h. 58m. M.
	1	31	Ecliptic oppo. or ○ full moon
	4	44	☿ greatest Hel. Lat. N.
17			Occul. *k* Geminorum, im. 8h. 41m. em. 9h. 41m.
	19	35	Juno in □ with the ☉
18	8	10	♀ greatest elong. 47. 16. E.
	22	42	Ceres in conj. with the ☉
20			Clock after the ☉ 2m. 4s.
	—		☽ rises 8h. 38m. A.
	—		☽ pass mer. 3h. 35m. M.
	—		☽ sets 11h. 29m. M.
	—		Occul *i* Leonis, im 18h. 19m. em. 19h. 31m.
21	9	12	☉ enters Capricornus. Winter commences
	13	44	♂ in conj. with the ☽ diff. of dec. 2. 39. S.
23	1	23	☽ in □ or last quarter
	20	29	☿ greatest elong. 22. 3. W.
25			Clock before the ☉ 0m. 26s.
	—		☽ rises 1h. 43m. M.
	—		☽ pass mer. 7h. 25m. M.
	—		☽ sets 0h. 54m. A.
27	3	29	♃ in conj. with the ☉
28	5	53	☿ in conj. with the ☽ diff. of dec. 1. 55. N.
29	5		☽ in Perigee
	14	37	♃ in conj. with the ☽ diff. of dec. 2. 21. N.
30	6	6	Ecliptic conj. or ● New Moon

The Satellites of Jupiter are invisible until the 21st day of January, 1854,—Jupiter being too near the Sun.

J. LEWTHWAITE, Rotherhithe.

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The S

D.	H.	M
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	17	1
		3
3	14	3
4	12	2
	20	3
5		
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6		
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7	0	
	22	
9		
10	4	
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11	6	
12	19	
13		
14	8	
	18	
15		
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D.	H.	M
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	17	1
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3	14	S
4	12	S
	20	S
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7	0	
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10	4	
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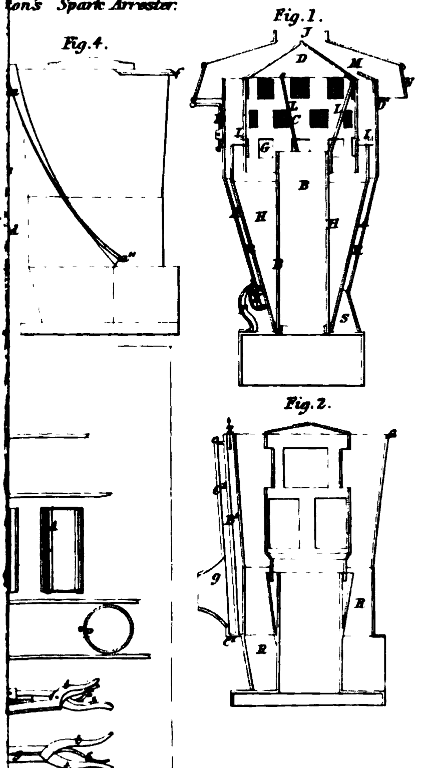
The S

PLATE V.

on's Spark Arrester.



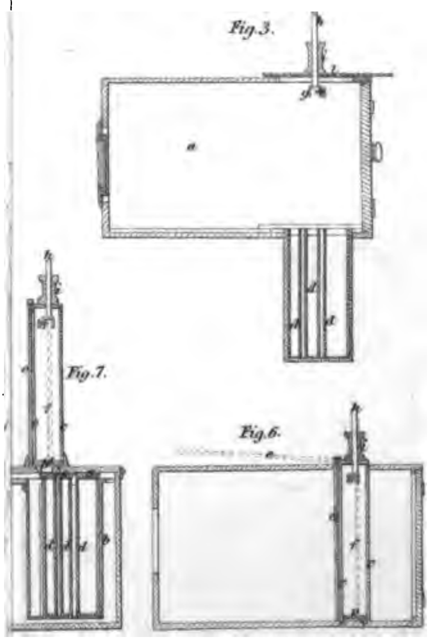


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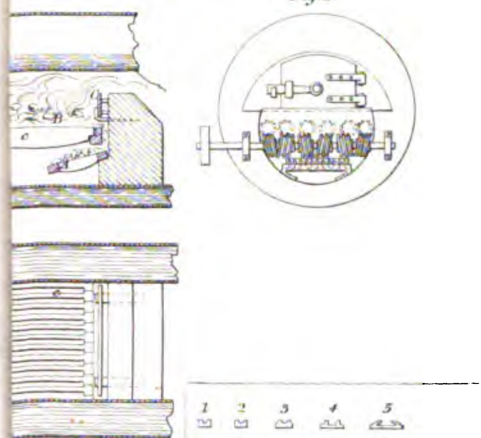
PLATE. VII.

...s in the manufacture of Iron.

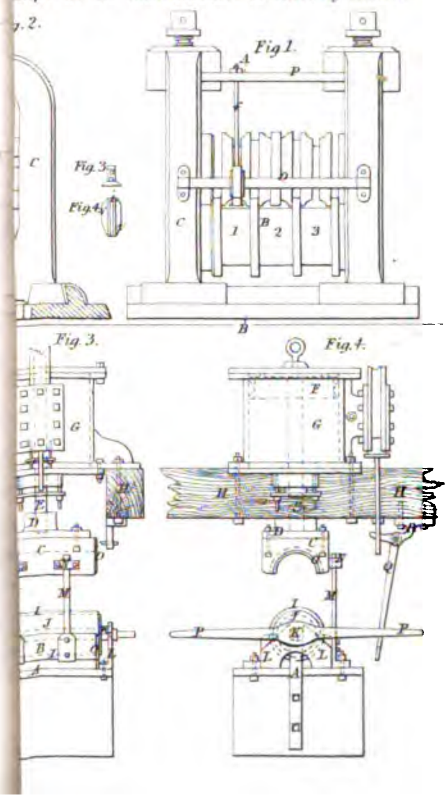
Fig.1.

Steven's Furnaces

Fig. 3.



...impts in the manufacture of railway chairs.



Davis' imp.ts in Cutting files.

Fig. 2.

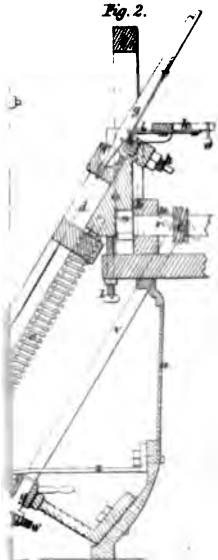


Fig. 1.

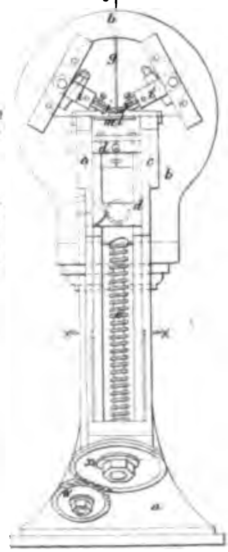


Fig. 1.

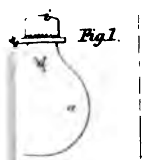


Fig. 4.

Griffin's imp.d app.ts for fixing type.

Fig. 1.

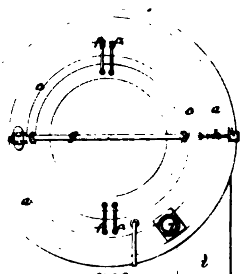
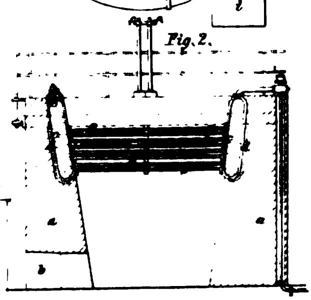


Fig. 2.



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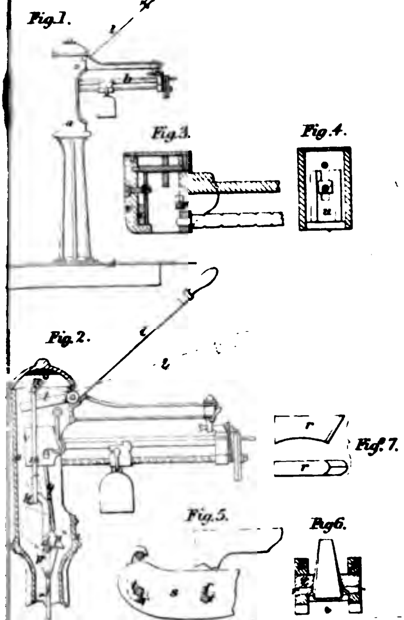
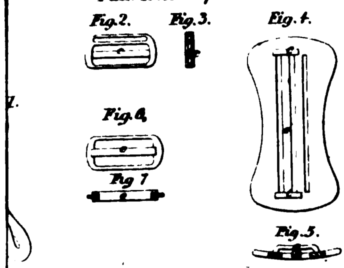
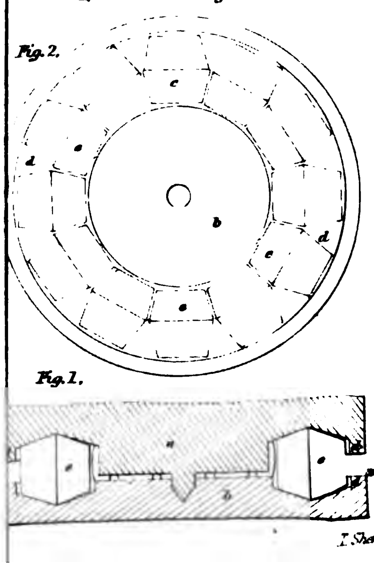
Pooley's imp^ts in Weighing machines.



Patersons imp^ts in Buckles.



Newton's Bearings.



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ollins' imp^ts. in Looms.